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Senate Meeting, October 8, 1986 (corrected)

Academic Senate
Illinois State University

ACADEMIC SENATE MINUTES

(Corrected)

October 8, 1986 Volume XVIII, No. 3

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Meetings of the Academic Senate are open to members of the University community. Persons attending the meetings may participate in discussion with the consent of the Senate. Persons desiring to bring items to the attention of the Senate may do so by contacting any member of the Senate.

ACADEMIC SENATE MINUTES

(Not approved by the Academic Senate)

October 8, 1986 Volume XVIII, No. 3

Call to Order

Chairperson Len Schmaltz called the meeting of the Academic Senate to order at 7:05 p.m. in the Circus Room of the Bone Student Center.

Roll Call

Secretary DeLong called the roll and declared a quorum present.

Approval of the Minutes of September 24, 1986

Mr. Spence had the following corrections to the minutes of September 24, 1986:

Page 11, twelfth line from the bottom of the page should read: "He responded to comments from Sen. Feaster.

Page 12, first paragraph, sixth line should read: "Of these, 12 hours in Area II must be courses involving pedagogy. That means that out of 24 possible maximum hours, only 12 hours of mathematical content courses could be elected."

Page 13, fifth paragraph, line 17 should read: "At some schools like...". The last paragraph on Page 13, first sentence, the wording should be: "...they had been provided when C&I changed theirs in 1985."

Page 15, fifth paragraph, fourth line should read: "specifically to teaching mathematics as opposed to requiring course work..."

Mr. Ken Strand had a few editorial changes, which were incorporated.

Mr. Lorber stated that Page 8, last paragraph, ninth line should read: "departments, rather than try to provide all the separate instructional focuses."

On Page 9, fifth paragraph, last line should read: "in the catalog that is not clear."

XVIII-10 Mr. Thiel moved to approve the Minutes of September 24, 1986 (Second, Eichstaedt). Motion carried on a voice vote.

Chairperson's Remarks

Mr. Schmaltz announced to the Senate that Academic Senate Secretary, Mary Edwards, was honored by one of the Civil Service Merit Awards. He thanked her for all her efforts for the Senate.

The chair stated that some senators were aware that Senator Getsi's daughter had been stricken with Guillaine-Barre disease last year, and would be the subject of a 4-day series about her recovery in The Pantagraph. The series would run this Sunday, and on Tuesday, Saturday and Sunday of the following week. Senators might be interested in the details of the progress she has made. Ms. Getsi would like to have extra copies of the articles sent to her in the English Department, if anyone wishes to save them.

Vice Chairperson's Remarks

Mr. Semlow had no remarks.

Student Body President's Remarks

Mr. Ritter stated that the Student Body Board of Directors has concluded the first half of the voter registration drive. They secured 2,500 student registrations during the first four weeks. During the 5-week period in November they hoped to reach a goal of five to seven thousand voter registrations.

Administrators' Remarks

Mr. Watkins announced that a search committee was being formed to select a new Dean of Continuing Education and Public Service. Dr. Bernard McCarney, Economics, had been chosen from the Panel of Ten to serve as Chair of this committee.

He commented on the professional way in which the University community had handled the collective bargaining election on October 1st. There should be a sense of pride in the way the election had been conducted.

Mr. Strand had no remarks.

Mr. Gamsky had no remarks.

Mr. Harden had no remarks.

ACTION ITEM

Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6)

Ms. Dixie Mills, Chair of the Academic Affairs Committee, introduced the proposal for a Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education. She attempted to focus the issues and synthesize the information her committee had gathered. She believed the Senate needed to address three questions: 1) Whether or not the Mathematics Education Sequence was consistent with the goals of the University? 2) Whether or not it offers a distinct academic option to students? 3) Whether or not it is a cost effective program?

She addressed the second question first. (Does this proposal offer a distinct academic option to students?) The objectives of the Math Education Proposal are to serve teachers of mathematics and to provide content courses focused at certain teaching levels. She had gone to two sources for information about the Curriculum & Instruction program: the original program proposal and the Provost's Review of the Department last year. The original proposal addressed other questions, so she relied heavily on the program review. In the program review, three of the four objectives in the program addressed pedagogical issues. The one that would more closely address a specialized area is: "to provide additional preparation in specialized areas." Others addressed curricular issues: to emphasize basic understandings and concepts in classroom management, research methodology, and human growth, development and curriculum theories; and secondly, to provide practice in the planning of educational objectives, implementing programs, designing instructional strategies, and using research and evaluation techniques; and the fourth is to focus on issues, trends, and research in education. Mr. Baxley provided some information about the C&I degree in the catalog description. The degree has four elements: a core of basic studies that is 12 hours; a set of courses designated special techniques that involves 12 hours; directed electives of 12 hours intended to be in the teaching field; and a culminating field experience of three hours. The question is whether the C&I program is designed to meet the same objectives as the Mathematics Education Sequence if it were approved. She did not think it was, for several reasons: 1) In the C&I program, the focus is more on general pedagogy. 2) If a student does not take the 12 hours of special techniques as designated or suggested, then he is not taking part in the C&I sequence in which he is enrolled (in the Jr. High/Middle School Sequence there are several courses in general.) First of all, the special techniques area, Area II of the program as described in the program review has as its purpose to present planning of educational objectives, implementation of programs, use of instructional strategies, and implications of research and evaluation of pupil outcomes. Suggested courses are: The Classical Functions of Jr. High; Curriculum in Jr. High/Middle School; Methods, Patterns and Issues in Early Adolescent Education; and Reading in the Content Areas. If a student does take as many hours in Mathematics as we were told that they could take, then they would take none of the courses in C&I, and they would also take their culminating field experience in Mathematics. Another reason that this program is not the same is because when we first looked at this program last May we were told that a C&I candidate could take only 15 or a maximum of 18 hours in Mathematics in the C&I Master's Program. The final reason is that most of the plans of study given as examples at the last meeting were in fact dated prior to the implementation of the C&I program in the Fall of 1984. Many of the plans of study were not for students enrolled in the new C&I program. She believed that for all the reasons above these two programs were not the same. Another question is whether the Math Education Sequence is consistent with the mission of the university. The University Mission Statement in the Academic Plan states as one of its priorities: "to provide master's degree programs which are among the best of the public institutions in Illinois...." It goes on to say that we will support certain kinds of Master's programs. "The University will initiate new master's....when societal need, faculty capability, and adequate funding are firmly established." She believed that these characteristics had been demonstrated. The mission also states

that "Existing faculty qualifications and intersts are demonstrably adequate to support a program with valid and distinctive goals." From the information presented at the last Senate meeting, we can see that the faculty meets that issue. The two goals for students graduating from the program: "as academic researchers or as post-graduate practitioners, have skills demonstrably consistent with relevant professional standards" and that "the research, creative activity, and professional practice performed by students and faculty meet relevant professional standards" will remain to be seen. The last goal that "the benefits of the program, defined in terms of the educational, research, and public service needs of the State of Illinois, are proportional to the incremental costs of the program," would be met as there is no added cost. Other criteria would be met such as: "they are developed from an area of academic importance, and/or they enhance academic quality; they are (or, have) developed from an area of excellence, they have developed to address student interest and/or societal need through distinctive and clearly perceived goals; they have developed with adequate funding potential (no funds needed); and they have developed with evidence of long-term benefit to the University. As to the cost effectiveness, the Budget Committee would be giving a report on that. The Academic Affairs Committee urged that the Senate act on this proposal this evening.

XVIII-11 Ms. Mills moved approval of the Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6). (Second, David Strand).

Mr. Ramsey reported from the Budget Committee. He stated that in the Math Education proposal there was no budgetary data. University guidelines do not require that a sequence have budgetary guidelines. The Budget Committee would be looking into this. This is a zero cost sequence, it will impose no costs on the University. The enrollments are not sufficiently great to exceed existing class size. A slight increase in tuition and fees might happen. The budgetary impact is virtually zero. The budgetary impacts on the C&I program would be approximately the same, with no impact. The Budget Committee concluded that the budgetary impacts of the proposed Mathematics Education Sequence were zero. The same conclusion applied to the summer school and academic year budgets.

Mr. Lorber referred to the Math Proposal, Page 3, Section 8. Rationale: (a) Junior high/middle school teachers of mathematics are no longer adequately served by the master's degree program offered in the ISU Department of Curriculum & Instruction." He then referred to the modified copy of the catalog entry that clearly indicates that students can take the same courses they were able to take prior to that change. The plans of study that were distributed for the information session dated from 1984--1986 and demonstrated that the advisement students have been receiving has been consistent for them to take that number of hours. He felt this was no longer an issue. The number of hours students can take in the Math Ed. Sequence would replace the same number of hours in the C&I program. The same sequence proposed by Math could be taken in the C&I Masters Program. The issue is no longer that the students can not take the number of hours they need in Math--they can. The second point of the rationale: "It is becoming increasingly important that people trained in the teaching of mathematics have this specialization noted on their official program transcripts." is a value call. Having a list of courses on the transcript is not enough to enable the potential employer to make a decision. It would be more meaningful for that

statement to have said Math Sequence.Perhaps this would be true, perhaps not. If you were hiring a Math teacher, would that make a significant difference, or would you look for course content and the courses that the person took. A third issue has arisen about the openess with which all departments can approach the curriculum revision process; the extent to which we can try to meet the needs of students by calling on the expertise within the various departments. To the extent that this proposal is ~~worded~~ supported, it sends a fairly clear message not only to C&I, but to every department on campus, that if you try to be open and capitalize on the expertise of other departments, you run the risk of other departments developing their own programs and taking the whole thing from you and no longer have a sharing operation, but a taking operation. It may not happen in every case.

Mr. Spence referred to a document he had distributed to senators' places this evening entitled "Sequence in Mathematics Education". A typographical error appeared in the fifth item, it should read April, 1986. He outlined the history of the proposal. The Academic Planning Committee had previously endorsed the concept of a sequence in mathematics education within the Department of Mathematics. In fact, this program is mentioned in the 1985-1990 Academic Plan as a new program under development in the Department of Mathematics. This Academic Plan was presented to the Academic Senate on November 28, 1984.

After the inclusion of the sequence in mathematics education in the 1985-1990 Academic Plan, the Department of Mathematics began to develop a specific proposal. When the proposal was completed in October of 1985, John Dossey (the Acting Chairperson of the Mathematics Department) discussed it with the Chairperson of the Department of Curriculum and Instruction. At the same time, the proposal was submitted to the Curriculum Committee of the College of Arts and Sciences, where it was subsequently passed unanimously and sent to the Graduate School. After receiving approval from the Graduate Curriculum Committee, the proposal was forwarded to the Graduate Council. In the course of its deliberations, the Graduate Council requested input from the Department of Curriculum and Instruction, but was told that there would be none. The Graduate Council then passed the proposal at a meeting on April 10, 1986, without a single negative vote from the thirteen members in attendance. Be aware that as of this time no objections to the concept of this sequence had been raised by anyone, including the two members of the Graduate Council from the Department of Curriculum and Instruction.

After being passed by the Graduate Council, the proposal was forwarded to the Academic Affairs Committee of the Senate. At this time the Department of Curriculum and Instruction objected to certain statements in the proposal that they felt misrepresented their program. On the basis of information provided to the Academic Affairs Committee in May by the Department of Curriculum and Instruction, the proposal was rewritten. This version of the proposal is the one under consideration tonight. However, at the Academic Affairs Committee's next meeting on September 3, 1986, the Department of Curriculum and Instruction charged that the revised proposal also misrepresents their program, even though the revision accurately reflects the information they had previously given to the Academic Affairs Committee. (The cover letter on the proposal documents this statement.) Moreover, for the first time, the Department of Curriculum and Instruction claimed that this proposal duplicates their program. Note that this claim was made 22 months after the proposed sequence was first announced to the Academic Senate, five months

after it was passed by the Graduate Council and four months after it was first considered by the Academic Affairs Committee.

These objections were given thorough consideration by the Academic Affairs Committee, which voted to forward the proposal to the Senate for approval. Of the members of the Academic Affairs Committee who participated in the voting, only Senator Lorber, a member of the Department of Curriculum and Instruction, voted against the proposal. Thus this proposal has passed through the Graduate Council and the Academic Affairs Committee with only one negative vote from the eighteen persons who voted on it.

Rationale for the Sequence in Mathematics Education: This proposal addresses a serious national problem, the scarcity of persons who are adequately prepared to teach mathematics at the elementary and middle school grades. The seriousness of this problem has been recognized at the federal level by the National Science Foundation, which recently set aside $6 million to develop model programs for the preparation of prospective middle-school teachers in mathematics and science. We at ISU can be proud of the fact that two of our mathematics education faculty, Alba Thompson and Carol Thornton, were selected to receive one of these grants, worth $744,300. The proposal before us provides a means for attacking the scarcity of qualified mathematics teachers in another way. Unlike the Thompson/Thornton grant, which focuses on preparing prospective teachers, this proposal will provide a means of current teachers to upgrade their knowledge of mathematics content and pedagogy by concentrating their graduate work in the field of mathematics education.

In speaking of Mathematics Education as a Discipline, Mr. Spence stated: In the last twenty years mathematics education has come to be recognized as a separate discipline, distinct from both mathematics and general education. Graduate programs in mathematics education exist at many institutions of higher education, including all of the Big Ten schools, Stanford, Columbia, and Forida State University, the University of California at Berkeley, and the Universities of Texas, Maryland, and Virginia. At the University of Georgia and the University of British Columbia, there are separate Departments of Mathematics Education. Further evidence that mathematics education is a separate discipline is provided by the existence of journals devoted solely to this discipline (e. g. the Journal for Research in Mathematics Education and Educational Studies in Mathematics.

Illinois State University can take pride in its mathematics education faculty, all of whom are members of the Department of Mathematics. Not only do these faculty comprise the largest collection of mathematics educators at any one institution in the United States, but many of our faculty are nationally recognized as outstanding scholars and leaders in this field. ISU has an outstanding undergraduate degree program in mathematics education which has been offered as a separate major since 1979. The quality of this program is well-known in Illinois and is reflected in the eagerness with which our graduates are sought by school districts from throughout the state.

The proposal under consideration seeks to establish a sequence in mathematics education within the existing master's degree program in mathematics. This proposal builds upon the strong undergraduate major in mathematics education and the current mathematics education concentration in the master's degree program in mathematics. This concentration is presently available to persons interested in specializing in mathematics teaching in the secondary schools.

Our proposal seeks to extend the current program to persons interested in specializing in the teaching of mathematics at the elementary and middle-school grades.
It is important to understand that this proposal is not a replacement for the existing program in the Department of Curriculum and Instruction. Instead it provides students interested in mathematics teaching an opportunity to select a program focusing on mathematics content and pedagogy as an alternative to the more general program in the Department of Curriculum and Instruction.

Some Senators have suggested that passing this proposal will create a precedent by establishing a master's degree program that has as its objective the preparation of teachers with a subject-matter specialty. In fact, such programs already exist on this campus. For example, there is a master's degree program in Business Education within the College of Business, programs in Art and Music Education within the College of Fine Arts, and a program in Educational Psychology within the College of Arts and Sciences. Just as these programs coexist with sequences in the Department of Curriculum and Instruction, we believe that the proposed emphases in elementary and middle-school mathematics will coexist with the corresponding sequences in the Department of Curriculum and Instruction.

Certainly our program will be quite different from theirs in several important respects. For example, the Department of Curriculum and Instruction restricts its students to at most 24 hours in the Mathematics Department, whereas the present proposal requires 30 hours in the Mathematics Department and allows students the option of taking all of their hours there. Moreover, as we learned at our last Senate meeting, the Curriculum and Instruction program restricts a student to at most 12 hours of mathematics content, whereas in the proposed sequence a student selecting the 39-hour option can obtain as many as 30 credits of mathematics content. This flexibility is necessary to satisfy the increasing call for teachers of elementary and middle-school mathematics to have stronger backgrounds in mathematics content. (John Dossey spoke to this issue at our last meeting.) Moreover, the present Illinois State Board of Education requirements for recognition as a full-time mathematics teacher for grades 6-8 require 15 hours of mathematics content, more than can be obtained in the Curriculum and Instruction program. Furthermore, our proposal will permit students to write theses and to take comprehensive examinations in their chosen specialty, mathematics education, these options are not possible in the Curriculum and Instruction program.

The Math Department believes that the sequence in mathematics education will attract new students to this university. Students wishing a graduate degree in mathematics education will be attracted to ISU because of the excellent reputation of the mathematics education faculty. In fact, the very existence of two programs, one in the Department of Mathematics and the other in the Department of Curriculum and Instruction, may attract students because they will be able to sample both programs before committing to either one. For this reason

we expect that this proposal will eventually have a positive effect on enrollments in both departments.

In summary, this proposal clearly meets the criteria for new programs set forth in the Academic Plan. It is a natural extension of the existing undergraduate major and master's degree concentration in mathematics education, it attacks the serious national shortage of adequately prepared mathematics teachers, it provides students another program option, and it can be achieved at no cost to the university. It should be passed.

Mr. Insel spoke as an "independent" mathematics senator. He expressed his personal viewpoint that this was a quality program. Having a child of Junior High age, he was especially interested in the quality of teaching at the elementary and junior high levels. He thought it very important for mathematics teachers to be prepared in content areas. He pointed out that in the substitution of 12 hours of special technique courses for pedagogy courses in the C&I program, John Dossey had cited a case of a student who did substitute mathematics courses and when it came time to take the comprehensive examination, she was tested on the material contained in the C&I courses which she had not taken. This student was not able to make the substitution satisfactorily, and has left the University.

Mr. Ken Strand said that he first would like to make clear that he had no problem with the professional credentials, abilities, and reputations of the math educators in the Math Department. He primarily wanted to deal with the manner in which evidence was provided in this case. He wanted reconsideration of Mr. Insel's previous comments since they were based on a sample size of one. He wanted reconsideration of Mr. Spence's comments about the big name institutions in which mathematics education is housed in the Math Department. Mr. Strand stated that the sampling was biased--no mention was made of the big name institutions in which mathematics education is not housed in the Math Department. No mention was made of the proportion of math education programs that are housed in the Math Departments of big name institutions.

Mr. Strand stated that his concerns about supporting evidence were related to appropriately serving student needs--as was a point of concern in the previous Senate meeting by Mr. Feaster, Mr. Johnston, and others. The concerns relate to a possible threat of departments and colleges being open game to one another. They relate to possible university instability. Mr. Strand stated that he was not suggesting that the threats would likely occur, but that little research-level effort was provided to suggest that the threats would not occur. He further stated that many of the senators knew that he taught research and statistics courses. He stated that sources of knowledge include authorities and the scientific method. At least many researchers would support a point of view that the latter provides more valid information than do authorities, even though the two are related. But experts have been incorrect time and time again, as have researchers--but likely more so for the experts than the outcomes of the research process. The Math Department provided convincing expert testimony. However, he was concerned that a more scholarly approach had not been taken relative to supporting claims. Little data and results of scholarly study had been provided. No analysis was made of possible repercussions--for example, the impact on personnel decisions within the Department of Curriculum & Instruction if the item is passed. Claims

that were based on biased sampling were provided. He stated that the preceding is especially noteworthy since this institution is on a new thrust toward scholarly productivity and evaluation, and that this institution has had an institutional research office for several years--in which several full-time people are employed to perform research regarding issues that are often analogous to the current item.

Mr. Wagner, as a student senator, asked Mr. Lorber about evidence that shows this will hurt the students' options. Mr. Lorber replied that the options available to students should be as wide as possible. The University has an obligation to avoid duplicate programs that don't really offer new options. Our contention is that the courses that the Math Department is proposing to include in the Master's program are already available to students through the C&I program. In other words, you as students could take those same courses in the program that already exists. So, therefore, there is really not a new option at all. It is the same option, but in a different program, in a different department. Another point concerns the extent to which the University wants to be training specialists. We have a precedent in the medical profession where they specialize about as far as they can go. But, they have now started to swing back and there are many general practitioners and family practice physicians being graduated now. There is a recognition of the need to have a larger picture than just the person's left foot. The same kind of issues pertain to education. On a school faculty you don't want people who are solely trained in Mathematics and unaware of the needs of the English faculty, or Art faculty. That kind of specialization is counter-productive. One of the nice things about the College of Education Core curriculum is that we have Math people, English people, and Social Science people sitting together discussing curriculum development and trying to see the school curriculum through a different set of eyes as different people express their ideas. That whole thing will be eliminated if all the programs are taken in Math Department, or within the English Department or in any other single department. You are narrowing your perspective. That in terms of public education is counter-productive.

Mr. Morreau appreciated the listing of events. He suggested that there were two terms to look at in analyzing a situation like this: 1) turf-building, and 2) turf maintenance. He was not interested in turf maintenance. Building and expanding programs should have a viable case. A difference in objectives does not dictate the means by which differences in objectives can be met. Differences in objectives might be met by one program as contrasted to two. We are talking about a program that needs no new courses, no new dollars, no new people to teach courses. If you need nothing, how can you have a program. If all the things are already present, how is it a new program. Going one step further, if the students in the C&I department are not denied professors in the Math Department, or resources in the Math Department, then in essence they have access to the same resources in C&I as they have in Math. There are problems in the present system and those problems are readily evident. There are communication problems as well as others. We heard of advisement problems, problems with handling of transcripts, problems with comprehensive examinations, problems in thesis advisement, problems in certification requirements, problems in number of courses required to take. Each of the problems being addressed have also been

addressed from 150 miles away at Northern Illinois University where we have a cooperative program entitled Regency Doctoral Programs, but they are dealt with cooperatively because we sit down and face the issues, and establish policies between two agencies. Statements that data had been biased regarding student interest and student need may or may not be true. He thought there was a communication problem between departments that needed to be addressed. He thought that the proposal should go back to the departments with the request that they work together to resolve their differences.

Mr. Belknap asked if the current C&I sequence met state certification standards. He had received the answer at the last Senate meeting from C&I that yes, they did. Mr. Spence had produced evidence that "No, this could not occur." He addressed his question to Curriculum & Instruction: Does C&I's program meet state certification standards?

Mr. Lorber deferred to Dr. John Crotts from the Department of Curriculum & Instruction. Mr. Crotts said at the Master's level there is no certification. It is possible under today's certification law for an individual student to gain undergraduate certification concurrently with graduate level work. If a student comes into the C&I program and wants to gain certification at the graduate level, he can not do that. He must go back and do the undergraduate sequence, then begin graduate level work. The second point that was raised was that Grades 6-8 teachers must have 18 hours of pure math. That is possible in any program sequence in Curriculum & Instruction.

Mr. Spence said there was a problem with the wording. The word certification was not ~~exact~~ the issue. He had avoided that word in his previous remarks. The present law in the State of Illinois says that if you are teaching Mathematics in Grades 6-8 and if the teaching of mathematics is 49% of your work load, then anyone who is a certified teacher can teach mathematics with no content background whatsoever. However, if your teaching is 50% or more in a content area then you must meet certain specific requirements. For Grades 6-8 for "Recognition as a half-time or more mathematics teacher" you must have completed 18 hours of mathematics education, including 3 hours of pedagogy, and 15 hours of content. For Grades 9-12, the secondary standards are much higher. Professor Crotts has maintained that 18 hours of content are possible in the C&I program. At our last meeting we heard from Sen. Lorber that that was not the case. This is an example of the contradictory information that has been prevalent. According to the minutes of our last meeting, the 12 hours of course work in Area II under the C&I program (Special Techniques) must be in pedagogical related courses. If that is the case, and a maximum of 24 hours can be taken in the Mathematics Department, there is no way that a student can receive 15 hours of math content courses. Twenty-four minus 12 does not leave room for 15. It is impossible to meet the State of Illinois Board of Education's requirements for recognition as a half-time or more mathematics teacher by taking all of the course work through the C&I Department.

Mr. Lorber asked if the document referred to was not for Math teachers alone. (Yes). He felt that we were talking about undergraduate programs with the fifteen hours of math content requirement. Mr. Spence said it referred to recognition by the State of someone who is half time or more teaching mathematics in Grades 6-8. It did not pertain to certification of elementary education teachers. It pertained to recognition by the State.

Mr. Lorber said that was exactly what the C&I department graduated from their four year undergraduate program.....people who then get certified to teach Mathematics. We were addressing a Master's Program. We were not addressing

the issue of a number of hours required. The people who are coming back at a Master's level are coming back with their teaching certificates and have met their requirements. We are talking about one level up. People that are coming back to be re-trained or pursue a Master's level program. They have their certification already. We are talking different things here. You're talking about people who are certified by the state to teach Mathematics in the public schools; and we are talking about people who graduate from four-year institutions. In 1988, they will have to pass a competency test. That's what we are talking about when we mention 15 hours. Let's not confuse the issue. This proposal is something entirely different than that. We are talking about a proposal at the Master's level. Let's not mix pears and oranges.

Mr. Spence disagreed with Sen. Lorber. The students being referred to were those who were returning for graduate study who do not satisfy the state requirements for recognition and wish to do so within the graduate program. At ISU last summer the math department ran such a program specifically for individuals like this. Students took the course work specifically to meet state requirements for recognition. When the rules were recently put into effect, there was no "grandfather clause". Anyone who moves from one district position to another could trigger these new standards. So someone who had a general undergraduate background, and was teaching at the middle school level, but teaching primarily mathematics, if they move from one district to another, or even within the same district these new rules come into effect. They would not be able to meet the requirements set forth to be recognized as a half time or more mathematics teacher.

Mr. Johnston said he agreed with Mr. Morreau's statement that the departments communicate and cooperate more. He wondered if the positive aspects of this proposal outweighed the negative aspects. He felt the data was confusing. If he voted yes, it would look like he was for the Math Department; if he voted no, he would be for the C&I department. He was for neither department. He felt it should be thought out more, and if the data is not clearly there, it should not be voted on.

Mr. Shulman spoke in favor of the proposal.

Mr. O'Rourke asked about the certification of a person to teach 50% or more in mathematics, including 15 hours of course work in mathematics content. Does that include undergraduate credit hours?

Mr. Spence said this could include undergraduate hours or hours obtained at another institution. There are plenty of persons now teaching at the middle school range who do not have any of these hours, and because of a move or re-location, would need to satisfy the new state requirements that have gone into effect only recently. Although it is true that teachers can count undergraduate hoursfor that, it is also true that people do not have those hours to count. We are talking about content courses like Calculus, Modern Algebra, Number Theory, Geometry, Computer Science, Probability and Statistics, etc. These are fields that not every person teaching at the elementary or middle school grades has background in.

Mr. O'Rourke asked if a person could graduate from a state school in Illinois, and become a teacher without having these math content courses. Mr. Spence answered yes.

Mr. Lorber answered, Yes. It was unlikely that an English teacher would be coming back to take a Math sequence. We are talking about Math teachers, those people who have had those 15 hours of Math. It would be quite possible for them to meet the current requirements under the current C&I Master's program. He yielded the chair to Dr. Baxley, Chair of the C&I Department. Dr. Baxley said teachers are certified with an undergraduate degree in the State of Illinois. They can be "endorsed" to teach in specific areas which the 18 hour requirement refers to.

Ms. Getsi yielded the floor to Alba Thompson of the Math Department. Ms. Thompson said that there may be a teacher teaching at the seventh grade level full-time mathematics, that teacher has been certified, he has a general elementary education certificate that certifies him to be teaching. According to the new law, however, that teacher is not qualified to be teaching Mathematics full time. Even though that teacher has received a certificate from the state because he went through an undergraduate program that fulfilled the requirements for certification at the elementary school level, that does not mean that the new laws concerning recognition will enable him to do this. There are many people teaching at the Jr. High level who are not well qualified even though they are certified. While they are certified, they are not qualified in the subject matter area. The new law states that a person teaching 50% or more in a content area will have to meet recognition standards. If they seek a new position elsewhere they will have to meet these standards, even though they are certified.

Mr. Schmaltz asked what happened to a person who continued to teach 49% of the time, and does not switch positions. Ms. Thompson said that under the law they could continue to do this. It was the 50% or more who were affected.

Mr. O'Rourke clarified that if a teacher at that level in Illinois who went through an undergraduate program without specific math content in their courses, in order to qualify for a new position teaching mathematics, would have to have 15 hours of math content? Ms. Thompson said 15 hours of math content and a three-hour pedagogy course.

The Senate recessed for 10 minutes.

Mr. Thiel looked at the proposal in the way it would affect students. He saw that it would affect students positively. He did not see that the proposal offered the same program currently housed in the C&I department. There is more emphasis on content, which was needed. It would appeal to two different audiences. ISU students would be more marketable if they chose to take this program. This would attract students to this university. This proposal is positive to students.

Ms. Getsi commented that there seemed to be some incredulity from senators that people could actually be certified to teach with no math courses at the college level at all. She knew for a fact that it was true. A parallel situation exists in English. There are teachers being certified who teach language arts and have only taken English 101 merely because it was a universal requirement for the university.

Mr. Schmaltz recognized Dr. Al Otto, Chair of the Math Department, who stated that all of the courses and faculty for Mathematics Education reside in the Math Department. The concept of this degree was approved by the Academic Planning

Committee to be in the 1985-90 Academic Plan. The Academic Plan is the way the University communicates to the Board of Regents their plan for the future. Apparently the Academic Planning Committee felt that a Master's Degree with a Sequence in Mathematics Education was consistent with the Mission of the University. On the issue of communication, he reminded the senate that Dr. John Dossey, former chair of the Department of Mathematics, talked to the chair of the Department of C&I concerning the proposal in Mathematics Education. According to Dr. Dossey, she did not indicate any opposition to the proposal. What they were asking for was a proposal to give students another choice--a decidedly different choice. The emphases and purposes of the program in Mathematics Education are decidedly different from those of the program in Curriculum and Instruction. These two programs do not duplicate each other. Rather, they complement each other. We believe that the peaceful co-existence of these two programs will add much to the effectiveness of Illinois State University. There is no way in the C&I program that a student wishing to take a balanced plan of mathematics education could take 20 hours of math and 20 hours of mathematics education. The two programs are decidedly different. As you have heard from the Budget Committee, the program is cost effective. Both the Budget Committee and the Academic Affairs Committee have stated that the programs do not duplicate each other. The Sequence in Mathematics Education would allow those students who wish to specialize in mathematics teaching in the elementary and junior high school levels to come and take the program of their choice, a program that they can have designated on their transcript, which will aid them in obtaining employment. It is a different program, a program that will enhance the graduates of Illinois State University.

Mr. Schmaltz recognized Dr. Dan Baxley, Chair of Curr. and Instruction, who said his department had tried to respond to the proposal. In the rationale for the proposal it stated: "the basic core of the Master's Degree program in Curriculum and Instruction no longer permits persons desiring certification as a mathematics teacher for grades 6-8 the 18 hours in mathematics and mathematics education needed to satisfy current state requirements." We contend that up to 24 hours of content specific (both content and pedagogy courses) are available through the Department of Curriculum & Instruction. We have provided student records that show this. We admit that there is some fuzzy wording in college catalogs, and have moved to ameliorate that situation. We feel that there is duplication. The issue of the transcript is not important. Under the new laws in the State of Illinois in that particular situation, the transcript wording is not a particular factor, because the certification office evaluates the transcript and decides through endorsement whether a student can teach more than 50% in a content area. Finally, the issue of sharing programs. He was concerned that the direction we are choosing here may send a signal to his department that we should be careful about sharing programs. The Math Department is excellent and has fine programs. We are now moving in a direction where programs may separate rather than work together. There is an implication from the public evaluating teacher education over the years that we need to move more toward sharing, with content area specialities. If a teacher education department moves to allow strong content area preparation at the undergraduate and graduate level, we may in fact establish a situation where the program later has to separate because the lion's share of the activity exists within a particular academic unit. He did not admit that the Math Department could not provide for those students under the umbrella of the C&I degree. His evidence showed that was possible. He encouraged cooperation between the departments.

XVIII-12 Mr. Shulman moved the previous question. (Second, Kirchner). Motion carried by a 2/3 vote.

XVIII-11 Vote on the approval of the Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6). Ms. Getsi requested a Roll Call Vote. The motion carried: 38 yes; 6 no, with one abstention.

Committee Reports:

Academic Affairs Committee - no report.

Administrative Affairs Committee - no report.

Budget Committee - no report.

Faculty Affairs Committee - no report.

Rules Committee - no report. Ms. Roof called a brief meeting following Senate.

Student Affairs Committee - no report.

Communications:

Mr. Semlow announced that he would like to meet with the student senators who had not attended the student caucus.

Mr. Johnston had heard through the grapevine that some members of the Senate feel that students should not get involved here. He urged senators to talk to him if they had any problems.

XVIII-13 Mr. Thiel moved to adjourn (Second, Ramsey). Motion carried on a voice vote. The meeting of the Academic Senate adjourned at 9:05 p.m.

FOR THE ACADEMIC SENATE

DOUGLAS A. DELONG, SECRETARY

Date: 10/8/86 Volume No. XVIII No. 3

NAME	ATTEN-DANCE	VOTE MOTION # XVII-11	MOTION #	MOTION #	MOTION #	MOTION #	MOTION #	VOICE VOTE MOTION #	Y
BELKNAP	P	NO						XVIII-10	X
BLACKWELL	excused	--						XVIII-11	X
BORG	P	YES						XVIII-12	X
DELONG	P	YES						XVIII-13	X
EICHSTAEDT	P	YES							
FEASTER	P	NO							
GAMSKY	P	YES							
GETSI	P	YES							
HALL	P	YES							
HARDEN	P	YES							
HUBER	P	YES							
INSEL	P	YES							
JOHNSTON	P	NO							
KELLOGG	P	YES							
KIRCHNER	P	YES							
LAVIN	P	YES							
LESCH	P	YES							
LORBER	P	NO							
MC CLERNON	P	YES							
MC KINLEY	P	YES							
MILLS	P	YES							
MORREAU	P	NO							
MOTTRAM	excused	--							
NELSEN	excused	--							
NEWBY	P	YES							
NEWMAN	P	YES							
O'CONNER	P	YES							
O'ROURKE	P	YES							
OSUNA	P	YES							
PASULKA	P	YES							
PETROSSIAN	P	YES							
POOLE	P	YES							
RAMSEY	P	YES							
RITTER	P	YES							
ROBERTS	P	YES							
ROOF	P	YES							
SCHMALTZ	P	ABSTAIN							
SCHWEGEL	excused	---							
SEMLOW	P	YES							
SESSIONS	P	YES							
SHULMAN	P	YES							
SPENCE	P	YES							
STRAND, D.	P	YES							
STRAND, K.	P	NO							
THIEL	P	YES							
WATKINS	P	YES							
WHITCOMB	P	YES							
WOOD	P	YES							
WAGNER	P	YES							
	TOTAL	38 YES							
		6 NO							
		1 ABSTENTION							

September 9, 1986

To: Members of the Academic Senate

From: Academic Affairs Committee

Re: Explanatory Note to Math Education Sequence Proposal

At our September 3rd meeting, the committee voted to recommend to the Senate for approval the proposal for the Mathematics Education sequence in the Masters of Mathematics degree. There was extensive debate during the meeting, however, about interpretation of course requirements in the C&I masters degree, and the potential impact of those requirements on a student's choice between the C&I program and the proposed Math Ed sequence. The committee voted to include this note of clarification as an addendum to the recommended proposal.

The proposal states that under the revised C&I masters program, a student choosing the Junior High/Middle School sequence may elect a maximum of 12-15 hours in mathematics and/or mathematics education. That statement reflects information provided by the C&I department to the mathematics department during preparation of the proposal, as well as information given by C&I representatives to the Academic Affairs Committee at a meeting last May.

During the meeting to consider the proposal, Dr. Baxley, the Chairperson of the C&I department, distributed a letter designed to clarify the confusion about the catalog description of the requirements for sequences of the C&I masters program. In his letter, Dr. Baxley noted that the department intended to revise the wording this semester. The summary comments stated that students in various sequences of the C&I Masters program "may take, with advisement, as many as 24 hours in a specific content area, not including the Culminating Field Experience which, itself, might focus on a special methods area." This option, however, is not identified in any of the written material that is available to prospective or current students, nor on the course planning sheet used by students. Consequently, the Academic Affairs committee felt that the statements included in the rationale for the Mathematics Education sequence reflected the C&I program options that are being offered to students.

9.11.86.6

SEP 11 1986

REQUEST FOR APPROVAL OF A SUBDIVISION OF A DEGREE MAJOR OR CHANGE OF NAME

1. **INSTITUTION** : Illinois State University

2. **RESPONSIBLE DEPARTMENT**: Mathematics Department

3. **PROPOSED SUBDIVISION TITLE**: Sequence in Mathematics Education

4. **PREVIOUS SUBDIVISION TITLE**: Not applicable

5. **CIPS CLASSIFICATION**: 13.1311

6. **DATE OF IMPLEMENTATION**: Fall, 1987

7. **DESCRIPTION OF CHANGE**: The Department of Mathematics currently offers a Master's Degree in Mathematics with concentrations in four areas. The proposed change is that one of these four areas of concentration be identified as a sequence.

MASTER'S DEGREE IN MATHEMATICS	Concentrations: statistics, applied mathematics, computational mathematics, mathematics education.

Figure 1: Current Master's Degree Program in Mathematics

Figure 1 shows the organization of the current Master's degree program in the Department of Mathematics. This program serves two types of students. First, the program serves persons who choose to concentrate in pure/applied mathematics. People with this emphasis usually obtain positions in industry (e.g., actuarial science) or continue their graduate education in a Ph.D. program at another institution. The second group served by this program is secondary mathematics education majors. These people are teachers of mathematics at the senior high school level. The current program requires students to complete coursework in algebra (MAT 317) and analysis (MAT 347). Also, students must take additional coursework in either algebra or analysis, must take a comprehensive examination in one of these two areas, or must give an oral presentation on some original work in an approved area of

9.11.86.6

mathematics. In addition, students are encouraged to complete several courses in one of the concentration areas shown in Figure 1.

Figure 2 shows the organization of the proposed program.

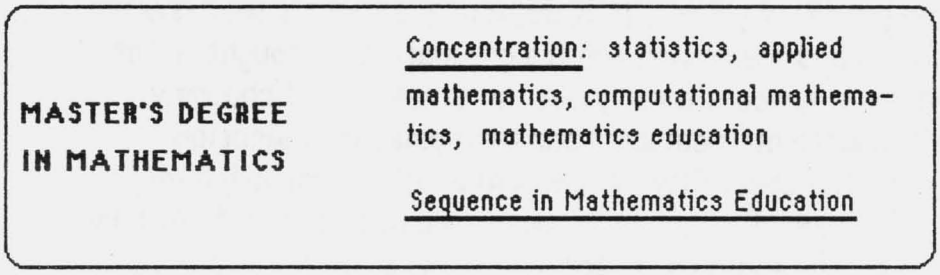

Figure 2: Proposed Master's Degree Program.

No new courses are needed to implement the proposed program, and no additional faculty, facilities, or equipment are needed for the proposed program. Everything needed to implement the proposed program is already in place; the proposed change involves only the formalization of a sequence in mathematics education.

The proposed program uses the notion of a core concept for the sequence. Sequences, by definition, are required to have a substantial core in common with the major, while at the same time being responsive to the needs of those for whom the sequence is designed. The proposed program will meet both of these objectives. The Department of Mathematics proposes that the core requirements be viewed as consisting of student knowledge of major fields of mathematics rather than as specific courses. In particular, the proposed core will maintain the same field requirements in mathematics (i.e., algebra and analysis) as does the M.S. in Mathematics, but will make adjustments in scope for the teaching level of the degree candidate. The addition of this sequence will permit persons interested in the teaching of mathematics at any level (not just senior high school as in the current program) to obtain a master's degree in the Department of Mathematics.

It is also important to note that the proposed sequence continues into the graduate program at the Master's level the clear distinctions between pure/applied mathematics and mathematics education already in the undergraduate mathematics program at ISU. The undergraduate program in mathematics education is strong and has shown substantial growth over the past few years. It is served by a faculty well-known throughout Illinois and the nation and its graduates are sought-after and well-received in schools throughout the state. The dichotomy between undergraduate mathematics and mathematics education majors delineates the speciality of the mathematics education major at that level. The present proposal requests the opportunity to extend this distinction of professional intent into the M.S. degree program in the Department of Mathematics.

8. RATIONALE FOR THE PROPOSAL: The Mathematics Department is proposing a sequence in mathematics education in order to meet the needs of teachers of mathematics in Illinois. In particular, there are two major reasons for the proposed change.

(a) Junior high/middle school teachers of mathematics are no longer adequately served by the master's degree program offered in the ISU Department of Curriculum and Instruction. Persons interested in teaching mathematics at the elementary and junior high school levels have, in the past, enrolled in the Master's Degree program in Elementary Education with a content focus in mathematics. This content focus allowed students to take as many as 24 semester hours (out of 32 or 39 hours) of coursework in mathematics and mathematics education. All of the courses for these 20-24 hours were taught by the mathematics education faculty in the Department of Mathematics in the College of Arts and Sciences.

The Master's Degree in Elementary Education is no longer offered by the College of Education. The program available now in the College of Education is a Master's Degree in Curriculum and Instruction. In this program, a student must select one of four sequences. The sequences are: (1) Early Childhood Education; (2) Elementary Education; (3) Junior High/Middle School Education; and (4) Secondary Education.

In this new program the number of hours of coursework in mathematics and mathematics education a student is allowed to take varies with the sequence selected (see Figure 3).

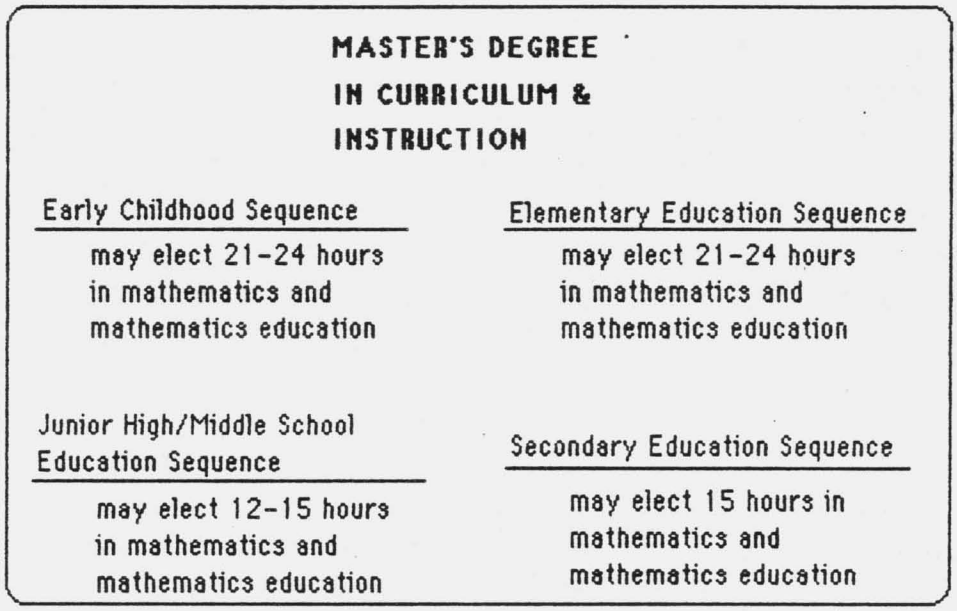

Figure 3: The current Master's Degree Program in Curriculum and Instruction.

Most of the students who enrolled in the previous Master's Degree program in Elementary Education with a content focus in mathematics were teachers with an interest in mathematics at the junior high/middle school level. As a consequence of this program change in the Department of Curriculum and Instruction, persons with an interest in the teaching of mathematics who enroll in the junior high/middle school sequence can now take only 12-15 semester hours of coursework in mathematics and mathematics education. This restriction is less than was allowed in the previous program and, most important, is inconsistent with the recent calls for stronger content preparation for teachers at all levels, especially the elementary and junior high/middle school levels. (See, for example, *Tomorrow's Teachers: A Report of The Holmes Group* and The Conference Board of the Mathematical Sciences report entitled *The Mathematical Sciences*

Curriculum K-12: What is Still Fundamental and What is Not.) Also, this change means that the basic core of the Master's Degree program in Curriculum and Instruction no longer permits persons desiring certification as a mathematics teacher for grades 6-8 the 18 hours in mathematics and mathematics education needed to satisfy current state requirements. The proposed mathematics education sequence allows teachers interested in teaching mathematics at the junior high/middle school grades to obtain a Master's degree from ISU and pursue their area of teaching interest. As noted above, there are no additional courses needed to implement this sequence since all of the mathematics content and mathematics education courses that elementary and junior high school teachers have taken as part of their Master's Degree in Elementary Education are already taught in the Mathematics Department. The proposed sequence simply calls for a reconfiguration of these courses into a sequence in mathematics education.

Because the junior high/middle school sequence in the new Master's Degree in Curriculum and Instruction allows only a limited number of hours from mathematics and mathematics education to count toward the degree requirements, teachers interested in specializing in mathematics at this level are looking elsewhere for their graduate training. For example, during the summers of 1984 and 1985 (and again in 1986), the Department of Mathematics at ISU operated an Honors Teachers summer training program. This program is funded by The National Science Foundation and has served approximately 60 elementary and junior high school teachers who have an interest in specializing in mathematics. At least half of these teachers are interested in pursuing the Master's degree from ISU but will not now do so because of the course restrictions in the junior high/middle school sequence for the Master's Degree program in Curriculum and Instruction. These teachers have taken or will have taken about 24 hours of coursework in mathematics and mathematics education. Were they to enroll in the junior high/middle school sequence of the Master's Degree program in Curriculum and Instruction, many of those hours would not count toward the core requirements for this degree. For this reason, many of these potential candidates for a Master's degree from ISU have stopped taking classes from ISU, and some are looking elsewhere for a Master's degree. Also, the 60 teachers selected for the NSF program were selected from an applicant pool of over 200

teachers. Therefore there is reason to believe that there are many teachers at the elementary and junior high school levels interested in pursuing the proposed sequence in mathematics education.

It is also important to note that students who enroll in the Early Childhood or Elementary Education Sequences in the Master's Degree program in Curriculum and Instruction and take the maximum 24 hours of mathematics and mathematics education (in the College of Arts and Sciences) would have 24 out of the 39 hours (about 62%) of their coursework outside the college overseeing their degree program. Furthermore, the Master's Degree program in Curriculum and Instruction also offers a 32-hour option (Comprehensive Exam Option) and a 26-28-hour option (Thesis Option). Were one to select these options, more than 50% of the student's coursework would be in the Mathematics Department, not the department conferring the degree. When more than half of a student's coursework is in the mathematics department, it seems reasonable that the student's major advisor be in the mathematics department. This seems particularly important if a student elects to write a thesis related to mathematics education. The thesis director should be a professor in mathematics education, and professors of mathematics education are in the Mathematics Department at ISU.

(b) It is becoming increasingly important that people trained in the teaching of mathematics have this specialization noted on their official program transcripts. Persons who emphasize mathematics in the new Master's Degree program in Curriculum and Instruction do not receive any notation on their official transcript indicating that they have special training in the teaching and learning of mathematics. Instead their transcript states that they have completed a sequence such as elementary education or junior high/middle school education. Likewise persons enrolled in the current Master's Degree program in Mathematics who take a "concentration" in mathematics education do not have this emphasis noted on their records. (Areas of concentration do not appear on transcripts.) It seems reasonable that a student whose program emphasized courses in the teaching and learning of mathematics should have this appear in some offical way on the transcript. A sequence in mathematics education would appear on a student's transcript and would draw attention to this specialized

training. Indeed teachers currently taking master's degree courses in the mathematics department tell us that they would like some official notation for their work in mathematics education. They feel that such a reference will help them when they apply for jobs and may influence their salary at a future time. Having this sequence noted on transcripts will draw attention to the specialized training these teachers have received, thus strengthening their credentials.

It was noted above that the proposed sequence utilizes the notion of a core concept for the formal sequence. In doing so, the proposal maintains the present core requirements of algebra and analysis but does not identify specific algebra and analysis courses every student must take. This allows different algebra and analysis courses to be taken by elementary school teachers than are taken by secondary school teachers. The core areas for persons interested in elementary and junior high school mathematics would be satisfied by MAT 304 and MAT 305. The core areas for persons interested in secondary school mathematics would be satisfied by MAT 317 and MAT 347 (as in the current program). Everyone electing this sequence will be required to take MAT 401 and MAT 403. In addition, persons pursuing an emphasis in elementary or junior high school mathematics must complete MAT 304, 305, and 402. Persons pursuing an emphasis in secondary school mathematics must complete MAT 317, 347, either 316 or 407, and three mathematics courses numbered 407 or above. Additional course hours in mathematics, mathematics education, and electives outside the Mathematics Department will be selected in consultation with the student's graduate advisor and will be approved by the Mathematics Department Graduate Director. A summary of these courses is provided in Table 1.

The attached catalog copy provides the full details for the proposed program.

Table 1. Courses involved in the Sequence in Mathematics Education.

• Emphasis in Elementary/Junior High School Mathematics:
MAT 304 Advanced topics in algebra and geometry for elementary and junior high school teachers
MAT 305 Measurement topics for elementary and junior high school teachers
MAT 401 Current research in school mathematics
MAT 402 Instructional strategies in mathematics
MAT 403 Theories of mathematics learning
Additional electives selected from mathematics, mathematics education, and education (e.g., curriculum and instruction)
• Emphasis in Secondary School Mathematics:
MAT 316 or MAT 407 Abstract Algebra
MAT 317 Linear algebra
MAT 347 Introduction to real analysis I
MAT 401 Current research in school mathematics
MAT 403 Theories of mathematics learning
Additional electives selected from mathematics, mathematics education, and education (e.g., curriculum and instruction) with at least three mathematics courses numbered 407 or higher

9. EXPECTED IMPACT OF THE PROPOSAL ON EXISTING CAMPUS PROGRAMS : The proposed sequence will have a positive impact on the Master's Degree program in the Department of Mathematics. As noted above, there already exist a significant number of teachers desiring this sequence in mathematics education. A large increase in the enrollment in the Master's degree in mathematics would be expected due to students entering the elementary/junior high school track in the proposed sequence. The proposed sequence should have minimal impact on existing M.S. programs other than the M.S. in Curriculum and Instruction. Its effect on the latter program is unclear. Some students who might currently opt for the M.S. in Curriculum and Instruction will undoubtedly view the sequence in mathematics education as more attractive and appropriate for their career goals. However, it is quite likely that the sequence in mathematics education will result in an increase in the number of students enrolling in certain

courses taught in the Department of Curriculum and Instruction. If the sequence in mathematics education attracts more graduate students to ISU, as we feel it will, many of these new students will enroll in courses in Curriculum and Instruction as part of their degree program in mathematics education.

Because the Departments of Mathematics and Curriculum and Instruction are currently offering distinct programs for persons interested in secondary education, there is no reason to suspect that separate programs for persons interested in elementary and junior high school education cannot coexist as viable programs. Indeed the existence of the proposed sequence in mathematics education will provide students a choice between a program that is heavily oriented toward mathematics and a program that permits some specialization in mathematics but is primarily directed toward more general pedagogical concerns.

10. EXPECTED CURRICULAR CHANGES INCLUDING NEW COURSES: All courses required in the proposed sequence are already in place as are all elective mathematics and mathematics education courses.

11. ANTICIPATED STAFFING ARRANGEMENTS: Staffing arrangements effective in 1985-86 are adequate to staff the proposed program. The Mathematics Department has 13 faculty with either the Ph.D. or Ed.D. in Mathematics Education. This is the largest collection of mathematics educators at any university in the United States.

12. ANTICIPATED FUNDING NEEDS AND SOURCES OF FUNDS: Current funds are adequate. The Department has been teaching the required and elective courses on a regular basis for several years.

Proposed 1987-88 Graduate Catalog copy pertaining to the proposed sequences in Mathematics and Mathematics Education

Programs Offered

The Department of Mathematics offers varied programs leading to the Master of Arts, Master of Science and Doctor of Arts degrees. At the master's level, a Sequence in Mathematics Education is available, along with concentrations in pure mathematics, statistics, computational mathematics, and applied mathematics. A doctoral program is offered to persons seeking advanced training for teaching in two-year and four-year colleges. Teaching assistantships and instructorships are available.

Master's Degree Programs

The student must meet the general university requirements listed elsewhere in this catalog for either the Master of Arts or Master of Science degree. In addition, the student must complete one of the two options in pure and applied mathematics or one of the two options in the Sequence in Mathematics Education. The Graduate Record Examination General (Aptitude) Test or the Advanced Test in Mathematics is required for admission.

Options in Pure and Applied Mathematics

Two options, requiring 39 and 32 hours, are available. Entering students must have completed an undergraduate mathematics major. Before completion of the master's degree, the student must complete MAT 317 and 347. A student must also select and complete either of the following two options:

Option I: At least 30 of the 39 hours required must be in mathematics. At least 18 of the 39 hours must be at the 400 level, with at least 12 of these in mathematics, including at least one course in algebra or analysis. Neither a thesis nor a comprehensive examination is required, but the student must maintain a 3.2 grade point average.

Option II: At least 24 of the 32 hours required must be in mathematics. At least 15 of the 32 hours must be at the 400 level, with at least 10 of these in mathematics. One of the following is required: a written examination over two areas, one of which must be algebra or analysis, or an oral presentation on a topic the student has investigated under the direction of a faculty member.

Areas of Concentration

There is considerable room for flexibility in selection of elective courses. The Graduate Advisor will assist students in selecting electives in the following areas of concentration.

Further graduate work in mathematics: 349, 407, 408, 447, 448, 449, 475, 476.
Statistics : 351, 356, 368, 450, 452, 453, 455, 456, 458.
Computational mathematics: 356, 360, 361, 363, 366, 368, 370.
Applied mathematics: 340, 341, 345, 349, 356, 360, 361, 362, 363, 366, 368, 370, 378.

Other courses not yet listed in this catalog are also available. Contact the Graduate Advisor.

Sequence in Mathematics Education

Individuals who are teaching or who plan to teach in public and private schools may wish to complete one of the two options in the Sequence in Mathematics Education. A program for each entering student will be designed in consultation with the graduate advisor to bring the student's credentials in content and methodology to a level appropriate for the needs of the student and the demands of the teaching profession. Each student electing this sequence must complete MAT 401 and 403. In addition, persons pursuing an emphasis in elementary or junior high school mathematics must complete MAT 304, 305, and 402. Persons pursuing an emphasis in secondary school mathematics must complete MAT 317, 347, either 316 or 407, and three mathematics courses numbered 407 or above. One of the following options must be selected and completed.

Option I: At least 30 of the 39 hours required must be in mathematics. In addition, at least 18 of the 39 hours must be taken at the 400 level, including at least 12 in mathematics. As a culminating experience, the student must conduct a research project and report the results in a colloquium. This project, which will be completed under the supervision of a graduate faculty member, must relate to the teaching of school mathematics and reflect the integration of mathematics teaching methods and mathematics content.

Option II: At least 24 of the 32 hours required must be in mathematics. In addition, at least 15 of the 32 hours must be taken at the 400 level, including at least 10 in mathematics. As a culminating experience, the student must complete either a written comprehensive examination or an approved thesis with no more than six hours of credit in Mathematics 499.

The Mathematics Department also cooperates with the Department of Curriculum and Instruction in the design of programs for elementary, junior high, and secondary teachers who elect the Master's Degree in Curriculum and Instruction.

ACADEMIC SENATE MINUTES

October 8, 1986 Volume XVIII, No. 3

CONTENTS

Meetings of the Academic Senate are open to members of the University community. Persons attending the meetings may participate in discussion with the consent of the Senate. Persons desiring to bring items to the attention of the Senate may do so by contacting any member of the Senate.

ACADEMIC SENATE MINUTES

(Not approved by the Academic Senate)

October 8, 1986 Volume XVIII, No. 3

Call to Order

Chairperson Len Schmaltz called the meeting of the Academic Senate to order at 7:05 p.m. in the Circus Room of the Bone Student Center.

Roll Call

Secretary DeLong called the roll and declared a quorum present.

Approval of the Minutes of September 24, 1986

Mr. Spence had the following corrections to the minutes of September 24, 1986:

Page 11, twelfth line from the bottom of the page should read: "He responded to comments from Sen. Feaster.

Page 12, first paragraph, sixth line should read: "Of these, 12 hours in Area II must be courses involving pedagogy. That means that out of 24 possible maximum hours, only 12 hours of mathematical content courses could be elected."

Page 13, fifth paragraph, line 17 should read: "At some schools like...". The last paragraph on Page 13, first sentence, the wording should be: "...they had been provided when C&I changed theirs in 1985."

Page 15, fifth paragraph, fourth line should read: "specifically to teaching mathematics as opposed to requiring course work..."

Mr. Ken Strand had a few editorial changes, which were incorporated.

Mr. Lorber stated that Page 8, last paragraph, ninth line should read: "departments, rather than try to provide all the separate instructional focuses."

On Page 9, fifth paragraph, last line should read: "in the catalog that is not clear."

XVIII-10 Mr. Thiel moved to approve the Minutes of September 24, 1986 (Second, Eichstaedt). Motion carried on a voice vote.

Chairperson's Remarks

Mr. Schmaltz announced to the Senate that Academic Senate Secretary, Mary Edwards, was honored by one of the Civil Service Merit Awards. He thanked her for all her efforts for the Senate.

The chair stated that some senators were aware that Senator Getsi's daughter had been stricken with Guillaine-Barre disease last year, and would be the subject of a 4-day series about her recovery in The Pantagraph. The series would run this Sunday, and on Tuesday, Saturday and Sunday of the following week. Senators might be interested in the details of the progress she has made. Ms. Getsi would like to have extra copies of the articles sent to her in the English Department, if anyone wishes to save them.

Vice Chairperson's Remarks

Mr. Semlow had no remarks.

Student Body President's Remarks

Mr. Ritter stated that the Student Body Board of Directors has concluded the first half of the voter registration drive. They secured 2,500 student registrations during the first four weeks. During the 5-week period in November they hoped to reach a goal of five to seven thousand voter registrations.

Administrators' Remarks

Mr. Watkins announced that a search committee was being formed to select a new Dean of Continuing Education and Public Service. Dr. Bernard McCarney, Economics, had been chosen from the Panel of Ten to serve as Chair of this committee.

He commented on the professional way in which the University community had handled the collective bargaining election on October 1st. There should be a sense of pride in the way the election had been conducted.

Mr. Strand had no remarks.

Mr. Gamsky had no remarks.

Mr. Harden had no remarks.

ACTION ITEM

Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6)

Ms. Dixie Mills, Chair of the Academic Affairs Committee, introduced the proposal for a Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education. She attempted to focus the issues and synthesize the information her committee had gathered. She believed the Senate needed to address three questions: 1) Whether or not the Mathematics Education Sequence was consistent with the goals of the University? 2) Whether or not it offers a distinct academic option to students? 3) Whether or not it is a cost effective program?

She addressed the second question first. (Does this proposal offer a distinct academic option to students?) The objectives of the Math Education Proposal are to serve teachers of mathematics and to provide content courses focused at certain teaching levels. She had gone to two sources for information about the Curriculum & Instruction program: the original program proposal and the Provost's Review of the Department last year. The original proposal addressed other questions, so she relied heavily on the program review. In the program review, three of the four objectives in the program addressed pedagogical issues. The one that would more closely address a specialized area is: "to provide additional preparation in specialized areas." Others addressed curricular issues: to emphasize basic understandings and concepts in classroom management, research methodology, and human growth, development and curriculum theories; and secondly, to provide practice in the planning of educational objectives, implementing programs, designing instructional strategies, and using research and evaluation techniques; and the fourth is to focus on issues, trends, and research in education. Mr. Baxley provided some information about the C&I degree in the catalog description. The degree has four elements: a core of basic studies that is 12 hours; a set of courses designated special techniques that involves 12 hours; directed electives of 12 hours intended to be in the teaching field; and a culminating field experience of three hours. The question is whether the C&I program is designed to meet the same objectives as the Mathematics Education Sequence if it were approved. She did not think it was, for several reasons: 1) In the C&I program, the focus is more on general pedagogy. 2) If a student does not take the 12 hours of special techniques as designated or suggested, then he is not taking part in the C&I sequence in which he is enrolled (in the Jr. High/Middle School Sequence there are several courses in general.) First of all, the special techniques area, Area II of the program as described in the program review has as its purpose to present planning of educational objectives, implementation of programs, use of instructional strategies, and implications of research and evaluation of pupil outcomes. Suggested courses are: The Classical Functions of Jr. High; Curriculum in Jr. High/Middle School; Methods, Patterns and Issues in Early Adolescent Education; and Reading in the Content Areas. If a student does take as many hours in Mathematics as we were told that they could take, then they would take none of the courses in C&I, and they would also take their culminating field experience in Mathematics. Another reason that this program is not the same is because when we first looked at this program last May we were told that a C&I candidate could take only 15 or a maximum of 18 hours in Mathematics in the C&I Master's Program. The final reason is that most of the plans of study given as examples at the last meeting were in fact dated prior to the implementation of the C&I program in the Fall of 1984. Many of the plans of study were not for students enrolled in the new C&I program. She believed that for all the reasons above these two programs were not the same. Another question is whether the Math Education Sequence is consistent with the mission of the university. The University Mission Statement in the Academic Plan states as one of its priorities: "to provide master's degree programs which are among the best of the public institutions in Illinois...." It goes on to say that we will support certain kinds of Master's programs. "The University will initiate new master's....when societal need, faculty capability, and adequate funding are firmly established." She believed that these characteristics had been demonstrated. The mission also states

that "Existing faculty qualifications and intersts are demonstrably adequate to support a program with valid and distinctive goals." From the information presented at the last Senate meeting, we can see that the faculty meets that issue. The two goals for students graduating from the program: "as academic researchers or as post-graduate practitioners, have skills demonstrably consistent with relevant professional standards" and that "the research, creative activity, and professional practice performed by students and faculty meet relevant professional standards" will remain to be seen. The last goal that "the benefits of the program, defined in terms of the educational, research, and public service needs of the State of Illinois, are proportional to the incremental costs of the program," would be met as there is no added cost. Other criteria would be met such as: "they are developed from an area of academic importance, and/or they enhance academic quality; they are (or, have) developed from an area of excellence, they have developed to address student interest and/or societal need through distinctive and clearly perceived goals; they have developed with adequate funding potential (no funds needed); and they have developed with evidence of long-term benefit to the University. As to the cost effectiveness, the Budget Committee would be giving a report on that. The Academic Affairs Committee urged that the Senate act on this proposal this evening.

XVIII-11 Ms. Mills moved approval of the Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6). (Second, David Strand).

Mr. Ramsey reported from the Budget Committee. He stated that in the Math Education proposal there was no budgetary data. University guidelines do not require that a sequence have budgetary guidelines. The Budget Committee would be looking into this. This is a zero cost sequence, it will impose no costs on the University. The enrollments are not sufficiently great to exceed existing class size. A slight increase in tuition and fees might happen. The budgetary impact is virtually zero. The budgetary impacts on the C&I program would be approximately the same, with no impact. The Budget Committee concluded that the budgetary impacts of the proposed Mathematics Education Sequence were zero. The same conclusion applied to the summer school and academic year budgets.

Mr. Lorber referred to the Math Proposal, Page 3, Section 8. Rationale: (a) Junior high/middle school teachers of mathematics are no longer adequately served by the master's degree program offered in the ISU Department of Curriculum & Instruction." He then referred to the modified copy of the catalog entry that clearly indicates that students can take the same courses they were able to take prior to that change. The plans of study that were distributed for the information session dated from 1984--1986 and demonstrated that the advisement students have been receiving has been consistent for them to take that number of hours. He felt this was no longer an issue. The number of hours students can take in the Math Ed. Sequence would replace the same number of hours in the C&I program. The same sequence proposed by Math could be taken in the C&I Masters Program. The issue is no longer that the students can not take the number of hours they need in Math--they can. The second point of the rationale: "It is becoming increasingly important that people trained in the teaching of mathematics have this specialization noted on their official program transcripts." is a value call. Having a list of courses on the transcript is not enough to enable the potential employer to make a decision. It would be more meaningful for that

statement to have said Math Sequence.Perhaps this would be true, perhaps not. If you were hiring a Math teacher, would that make a significant difference, or would you look for course content and the courses that the person took. A third issue has arisen about the openess with which all departments can approach the curriculum revision process; the extent to which we can try to meet the needs of students by calling on the expertise within the various departments. To the extent that this proposal is worded, it sends a fairly clear message not only to C&I, but to every department on campus, that if you try to be open and capitalize on the expertise of other departments, you run the risk of other departments developing their own programs and taking the whole thing from you and no longer have a sharing operation, but a taking operation. It may not happen in every case.

Mr. Spence referred to a document he had distributed to senators' places this evening entitled "Sequence in Mathematics Education". A typographical error appeared in the fifth item, it should read April, 1986. He outlined the history of the proposal. The Academic Planning Committee had previously endorsed the concept of a sequence in mathematics education within the Department of Mathematics. In fact, this program is mentioned in the 1985-1990 Academic Plan as a new program under development in the Department of Mathematics. This Academic Plan was presented to the Academic Senate on November 28, 1984.

After the inclusion of the sequence in mathematics education in the 1985-1990 Academic Plan, the Department of Mathematics began to develop a specific proposal. When the proposal was completed in October of 1985, John Dossey (the Acting Chairperson of the Mathematics Department) discussed it with the Chairperson of the Department of Curriculum and Instruction. At the same time, the proposal was submitted to the Curriculum Committee of the College of Arts and Sciences, where it was subsequently passed unanimously and sent to the Graduate School. After receiving approval from the Graduate Curriculum Committee, the proposal was forwarded to the Graduate Council. In the course of its deliberations, the Graduate Council requested input from the Department of Curriculum and Instruction, but was told that there would be none. The Graduate Council then passed the proposal at a meeting on April 10, 1986, without a single negative vote from the thirteen members in attendance. Be aware that as of this time no objections to the concept of this sequence had been raised by anyone, including the two members of the Graduate Council from the Department of Curriculum and Instruction.

After being passed by the Graduate Council, the proposal was forwarded to the Academic Affairs Committee of the Senate. At this time the Department of Curriculum and Instruction objected to certain statements in the proposal that they felt misrepresented their program. On the basis of information provided to the Academic Affairs Committee in May by the Department of Curriculum and Instruction, the proposal was rewritten. This version of the proposal is the one under consideration tonight. However, at the Academic Affairs Committee's next meeting on September 3, 1986, the Department of Curriculum and Instruction charged that the revised proposal also misrepresents their program, even though the revision accurately reflects the information they had previously given to the Academic Affairs Committee. (The cover letter on the proposal documents this statement.) Moreover, for the first time, the Department of Curriculum and Instruction claimed that this proposal duplicates their program. Note that this claim was made 22 months after the proposed sequence was first announced to the Academic Senate, five months

it was first considered by the Academic Affairs Committee.

These objections were given thorough consideration by the Academic Affairs Committee, which voted to forward the proposal to the Senate for approval. Of the members of the Academic Affairs Committee who participated in the voting, only Senator Lorber, a member of the Department of Curriculum and Instruction, voted against the proposal. Thus this proposal has passed through the Graduate Council and the Academic Affairs Committee with only one negative vote from the eighteen persons who voted on it.

Rationale for the Sequence in Mathematics Education: This proposal addresses a serious national problem, the scarcity of persons who are adequately prepared to teach mathematics at the elementary and middle school grades. The seriousness of this problem has been recognized at the federal level by the National Science Foundation, which recently set aside $6 million to develop model programs for the preparation of prospective middle-school teachers in mathematics and science. We at ISU can be proud of the fact that two of our mathematics education faculty, Alba Thompson and Carol Thornton, were selected to receive one of these grants, worth $744,300. The proposal before us provides a means for attacking the scarcity of qualified mathematics teachers in another way. Unlike the Thompson/Thornton grant, which forcuses on preparing prospective teachers, this proposal will provide a means of current teachers to upgrade their knowledge of mathematics content and pedagogy by concentrating their graduate work in the field of mathematics education.

In speaking of Mathematics Education as a Discipline, Mr. Spence stated: In the last twenty years mathematics education has come to be recognized as a separate discipline, distinct from both mathematics and general education. Graduate programs in mathematics education exist at many institutions of higher education, including all of the Big Ten schools, Stanford, Columbia, and Forida State University, the University of California at Berkeley, and the Universities of Texas, Maryland, and Virginia. At the University of Georgia and the University of British Columbia, there are separate Departments of Mathematics Education. Further evidence that mathematics education is a separate discipline is provide by the existence of journals devoted solely to this discipline (e. g. the Journal for Research in Mathematics Education and Educational Studies in Mathematics.

Illinois State University can take pride in its mathematics education faculty, all of whom are members of the Department of Mathematics. Not only do these faculty comprise the largest collection of mathematics educators at any one institution in the United States, but many of our faculty are nationally recognized as outstanding scholars and leaders in this field. ISU has an outstanding undergraduate degree program in mathematics education which has been offered as a separate major since 1979. The quality of this program is well-known in Illinois and is reflected in the eagerness with which our graduates are sought by school districts from throughout the state.

The proposal under consideration seeks to establish a sequence in mathematics education within the existing master's degree program in mathematics. This proposal builds upon the strong undergraduate major in mathematics education and the current mathematics education concentration in the master's degree program in mathematics. This concentration is presently available to persons interested in specializing in mathematics teaching in the secondary schools.

Our proposal seeks to extend the current program to persons interested in specializing in the teaching of mathematics at the elementary and middle-school grades.
It is important to understand that this proposal is not a replacement for the existing program in the Department of Curriculum and Instruction. Instead it provides students interested in mathematics teaching an opportunity to select a program focusing on mathematics content and pedagogy as an alternative to the more general program in the Department of Curriculum and Instruction.

Some Senators have suggested that passing this proposal will create a precedent by establishing a master's degree program that has as its objective the preparation of teachers with a subject-matter specialty. In fact, such programs already exist on this campus. For example, there is a master's degree program in Business Education within the College of Business, programs in Art and Music Education within the College of Fine Arts, and a program in Educational Psychology within the College of Arts and Sciences. Just as programs coexist with sequences in the Department of Curriculum and Instruction, we believe that the proposed emphases in elementary and middle-school mathematics will coexist with the corresponding sequences in the Department of Curriculum and Instruction.

Certainly our program will be quite different from theirs in several important respects. For example, the Department of Curriculum and Instruction restricts its students to at most 24 hours in the Mathematics Department, whereas the present proposal requires 30 hours in the Mathematics Department and allows students the option of taking all of their hours there. Moreover, as we learned at our last Senate meeting, the Curriculum and Instruction program restricts a student to at most 12 hours of mathematics content, whereas in the proposed sequence a student selecting the 39-hour option can obtain as many as 30 credits of mathematics content. This flexibility is necessary to satisfy the increasing call for teachers of elementary and middle-school mathematics to have stronger backgrounds in mathematics content. (John Dossey spoke to this issue at our last meeting.) Moreover, the present Illinois State Board of Education requirements for recognition as a full-time mathematics teacher for grades 6-8 require 15 hours of mathematics content, more than can be obtained in the Curriculum and Instruction program. Furthermore, our proposal will permit students to write theses and to take comprehensive examinations in their chosen specialty, mathematics education, these options are not possible in the Curriculum and Instruction program.

The Math Department believes that the sequence in mathematics education will attract new students to this university. Students wishing a graduate degree in mathematics education will be attracted to ISU because of the excellent reputation of the mathematics education faculty. In fact, the very existence of two programs, one in the Department of Mathematics and the other in the Department of Curriculum and Instruction, may attract students because they will be able to sample both programs before committing to either one. For this reason

we expect that this proposal will eventually have a positive effect on enrollments in both departments.

In summary, this proposal clearly meets the criteria for new programs set forth in the Academic Plan. It is a natural extension of the existing undergraduate major and master's degree concentration in mathematics education, it attacks the serious national shortage of adequately prepared mathematics teachers, it provides students another program option, and it can be achieved at no cost to the university. It should be passed.

Mr. Insel spoke as an "independent" mathematics senator. He expressed his personal viewpoint that this was a quality program. Having a child of Junior High age, he was especially interested in the quality of teaching at the elementary and junior high levels. He thought it very important for mathematics teachers to be prepared in content areas. He pointed out that in the substitution of 12 hours of special technique courses for pedagogy courses in the C&I program, John Dossey had cited a case of a student who did substitute mathematics courses and when it came time to take the comprehensive examination, she was tested on the material contained in the C&I courses which she had not taken. This student was not able to make the substitution satisfactorily, and has left the University.

Mr. Ken Strand said that he first would like to make clear that he had no problem with the professional credentials, abilities, and reputations of the math educators in the Math Department. He primarily wanted to deal with the manner in which evidence was provided in this case. He wanted reconsideration of Mr. Insel's previous comments since they were based on a sample size of one. He wanted reconsideration of Mr. Spence's comments about the big name institutions in which mathematics education is housed in the Math Department. Mr. Strand stated that the sampling was biased--no mention was made of the big name institutions in which mathematics education is not housed in the Math Department. No mention was made of the proportion of math education programs that are housed in the Math Departments of big name institutions.

Mr. Strand stated that his concerns about supporting evidence were related to appropriately serving student needs--as was a point of concern in the previous Senate meeting by Mr. Feaster, Mr. Johnston, and others. The concerns relate to a possible threat of departments and colleges being open game to one another. They relate to possible university instability. Mr. Strand stated that he was not suggesting that the threats would likely occur, but that little research-level effort was provided to suggest that the threats would not occur. He further stated that many of the senators knew that he taught research and statistics courses. He stated that sources of knowledge include authorities and the scientific method. At least many researchers would support a point of view that the latter provides more valid information than do authorities, even though the two are related. But experts have been incorrect time and time again, as have researchers--but likely more so for the experts than the outcomes of the research process. The Math Department provided convincing expert testimony. However, he was concerned that a more scholarly approach had not been taken relative to supporting claims. Little data and results of scholarly study had been provided. No analysis was made of possible repercussions--for example, the impact on personnel decisions within the Department of Curriculum & Instruction if the item is passed. Claims

that were based on biased sampling were provided. He stated that the preceding is especially noteworthy since this institution is on a new thrust toward scholarly productivity and evaluation, and that this institution has had an institutional research office for several years--in which several full-time people are employed to perform research regarding issues that are often analogous to the current item.

Mr. Wagner, as a student senator, asked Mr. Lorber about evidence that shows this will hurt the students' options. Mr. Lorber replied that the options available to students should be as wide as possible. The University has an obligation to avoid duplicate programs that don't really offer new options. Our contention is that the courses that the Math Department is proposing to include in the Master's program are already available to students through the C&I program. In other words, you as students could take those same courses in the program that already exists. So, therefore, there is really not a new option at all. It is the same option, but in a different program, in a different department. Another point concerns the extent to which the University wants to be training specialists. We have a precedent in the medical profession where they specialize about as far as they can go. But, they have now started to swing back and there are many general practitioners and family practice physicians being graduated now. There is a recognition of the need to have a larger picture than just the person's left foot. The same kind of issues pertain to education. On a school faculty you don't want people who are solely trained in Mathematics and unaware of the needs of the English faculty, or Art faculty. That kind of specialization is counter-productive. One of the nice things about the College of Education Core curriculum is that we have Math people, English people, and Social Science people sitting together discussing curriculum development and trying to see the school curriculum through a different set of eyes as different people express their ideas. That whole thing will be eliminated if all the programs are taken in Math Department, or within the English Department or in any other single department. You are narrowing your perspective. That in terms of public education is counter-productive.

Mr. Morreau appreciated the listing of events. He suggested that there were two terms to look at in analyzing a situation like this: 1) turf-building, and 2) turf maintenance. He was not interested in turf maintenance. Building and expanding programs should have a viable case. A difference in objectives does not dictate the means by which differences in objectives can be met. Differences in objectives might be met by one program as contrasted to two. We are talking about a program that needs no new courses, no new dollars, no new people to teach courses. If you need nothing, how can you have a program. If all the things are already present, how is it a new program. Going one step further, if the students in the C&I department are not denied professors in the Math Department, or resources in the Math Department, then in essence they have access to the same resources in C&I as they have in Math. There are problems in the present system and those problems are readily evident. There are communication problems as well as others. We heard of advisement problems, problems with handling of transcripts, problems with comprehensive examinations, problems in thesis advisement, problems in certification requirements, problems in number of courses required to take. Each of the problems being addressed have also been

addressed from 150 miles away at Northern Illinois University where we have a cooperative program entitled Regency Doctoral Programs, but they are dealt with cooperatively because we sit down and face the issues, and establish policies between two agencies. Statements that data had been biased regarding student interest and student need may or may not be true. He thought there was a communication problem between departments that needed to be addressed. He thought that the proposal should go back to the departments with the request that they work together to resolve their differences.

Mr. Belknap asked if the current C&I sequence met state certification standards. He had received the answer at the last Senate meeting from C&I that yes, they did. Mr. Spence had produced evidence that "No, this could not occur." He addressed his question to Curriculum & Instruction: Does C&I's program meet state certification standards?

Mr. Lorber deferred to Dr. John Crotts from the Department of Curriculum & Instruction. Mr. Crotts said at the Master's level there is no certification. It is possible under today's certification law for an individual student to gain undergraduate certification concurrently with graduate level work. If a student comes into the C&I program and wants to gain certification at the graduate level, he can not do that. He must go back and do the undergraduate sequence, then begin graduate level work. The second point that was raised was that Grades 6-8 teachers must have 18 hours of pure math. That is possible in any program sequence in Curriculum & Instruction.

Mr. Spence said there was a problem with the wording. The word certification was not exact. He had avoided that word in his previous remarks. The present law in the State of Illinois says that if you are teaching Mathematics in Grades 6-8 and if the teaching of mathematics is 49% of your work load, then anyone who is a certified teacher can teach mathematics with no content background whatsoever. However, if your teaching is 50% or more in a content area then you must meet certain specific requirements. For Grades 6-8 for "Recognition as a half-time or more mathematics teacher" you must have completed 18 hours of mathematics education, including 3 hours of pedagogy, and 15 hours of content. For Grades 9-12, the secondary standards are much higher. Professor Crotts has maintained that 18 hours of content are possible in the C&I program. At our last meeting we heard from Sen. Lorber that that was not the case. This is an example of the contradictory information that has been prevalent. According to the minutes of our last meeting, the 12 hours of course work in Area II under the C&I program (Special Techniques) must be in pedagogical related courses. If that is the case, and a maximum of 24 hours can be taken in the Mathematics Department, there is no way that a student can receive 15 hours of math content courses. Twenty-four minus 12 does not leave room for 15. It is impossible to meet the State of Illinois Board of Education's requirements for recognition as a half-time or more mathematics teacher by taking all of the course work through the C&I Department.

Mr. Lorber asked if the document referred to was not for Math teachers alone. (Yes). He felt that we were talking about undergraduate programs with the fifteen hours of math content requirement. Mr. Spence said it referred to recognition by the State of someone who is half time or more teaching mathematics in Grades 6-8. It did not pertain to certification of elementary education teachers. It pertained to recognition by the State.

Mr. Lorber said that was exactly what the C&I department graduated from their four year undergraduate program.....people who then get certified to teach Mathematics. We were addressing a Master's Program. We were not addressing

the issue of a number of hours required. The people who are coming back at a Master's level are coming back with their teaching certificates and have met their requirements. We are talking about one level up. People that are coming back to be re-trained or pursue a Master's level program. They have their certification already. We are talking different things here. You're talking about people who are certified by the state to teach Mathematics in the public schools; and we are talking about people who graduate from four-year institutions. In 1988, they will have to pass a competency test. That's what we are talking about when we mention 15 hours. Let's not confuse the issue. This proposal is something entirely different than that. We are talking about a proposal at the Master's level. Let's not mix pears and oranges.

Mr. Spence disagreed with Sen. Lorber. The students being referred to were those who were returning for graduate study who do not satisfy the state requirements for recognition and wish to do so within the graduate program. At ISU last summer the math department ran such a program specifically for individuals like this. Students took the course work specifically to meet state requirements for recognition. When the rules were recently put into effect, there was no "grandfather clause". Anyone who moves from one district position to another could trigger these new standards. So someone who had a general undergraduate background, and was teaching at the middle school level, but teaching primarily mathematics, if they move from one district to another, or even within the same district these new rules come into effect. They would not be able to meet the requirements set forth to be recognized as a half time or more mathematics teacher.

Mr. Johnston said he agreed with Mr. Morreau's statement that the departments communicate and cooperate more. He wondered if the positive aspects of this proposal outweighed the negative aspects. He felt the data was confusing. If he voted yes, it would look like he was for the Math Department; if he voted no, he would be for the C&I department. He was for neither department. He felt it should be thought out more, and if the data is not clearly there, it should not be voted on.

Mr. Shulman spoke in favor of the proposal.

Mr. O'Rourke asked about the certification of a person to teach 50% or more in mathematics, including 15 hours of course work in mathematics content. Does that include undergraduate credit hours?

Mr. Spence said this could include undergraduate hours or hours obtained at another institution. There are plenty of persons now teaching at the middle school range who do not have any of these hours, and because of a move or re-location, would need to satisfy the new state requirements that have gone into effect only recently. Although it is true that teachers can count undergraduate hoursfor that, it is also true that people do not have those hours to count. We are talking about content courses like Calculus, Modern Algebra, Number Theory, Geometry, Computer Science, Probability and Statistics, etc. These are fields that not every person teaching at the elementary or middle school grades has background in.

Mr. O'Rourke asked if a person could graduate from a state school in Illinois, and become a teacher without having these math content courses. Mr. Spence answered yes.

Mr. Lorber answered, Yes. It was unlikely that an English teacher would be coming back to take a Math sequence. We are talking about Math teachers, those people who have had those 15 hours of Math. It would be quite possible for them to meet the current requirements under the current C&I Master's program. He yielded the chair to Dr. Baxley, Chair of the C&I Department. Dr. Baxley said teachers are certified with an undergraduate degree in the State of Illinois. They can be "endorsed" to teach in specific areas which the 18 hour requirement refers to.

Ms. Getsi yielded the floor to Alba Thompson of the Math Department. Ms. Thompson said that there may be a teacher teaching at the seventh grade level full-time mathematics, that teacher has been certified, he has a general elementary education certificate that certifies him to be teaching. According to the new law, however, that teacher is not qualified to be teaching Mathematics full time. Even though that teacher has received a certificate from the state because he went through an undergraduate program that fulfilled the requirements for certification at the elementary school level, that does not mean that the new laws concerning recognition will enable him to do this. There are many people teaching at the Jr. High level who are not well qualified even though they are certified. While they are certified, they are not qualified in the subject matter area. The new law states that a person teaching 50% or more in a content area will have to meet recognition standards. If they seek a new position elsewhere they will have to meet these standards, even though they are certified.

Mr. Schmaltz asked what happened to a person who continued to teach 49% of the time, and does not switch positions. Ms. Thompson said that under the law they could continue to do this. It was the 50% or more who were affected.

Mr. O'Rourke clarified that if a teacher at that level in Illinois who went through an undergraduate program without specific math content in their courses, in order to qualify for a new position teaching mathematics, would have to have 15 hours of math content? Ms. Thompson said 15 hours of math content and a three-hour pedagogy course.

The Senate recessed for 10 minutes.

Mr. Thiel looked at the proposal in the way it would affect students. He saw that it would affect students positively. He did not see that the proposal offered the same program currently housed in the C&I department. There is more emphasis on content, which was needed. It would appeal to two different audiences. ISU students would be more marketable if they chose to take this program. This would attract students to this university. This proposal is positive to students.

Ms. Getsi commented that there seemed to be some incredulity from senators that people could actually be certified to teach with no math courses at the college level at all. She knew for a fact that it was true. A parallel situation exists in English. There are teachers being certified who teach language arts and have only taken English 101 merely because it was a universal requirement for the university.

Mr. Schmaltz recognized Dr. Al Otto, Chair of the Math Department, who stated that all of the courses and faculty for Mathematics Education reside in the Math Department. The concept of this degree was approved by the Academic Planning

Committee to be in the 1985-90 Academic Plan. The Academic Plan is the way the University communicates to the Board of Regents their plan for the future. Apparently the Academic Planning Committee felt that a Master's Degree with a Sequence in Mathematics Education was consistent with the Mission of the University. On the issue of communication, he reminded the senate that Dr. John Dossey, former chair of the Department of Mathematics, talked to the chair of the Department of C&I concerning the proposal in Mathematics Education. According to Dr. Dossey, she did not indicate any opposition to the proposal. What they were asking for was a proposal to give students another choice--a decidedly different choice. The emphases and purposes of the program in Mathematics Education are decidedly different from those of the program in Curriculum and Instruction. These two programs do not duplicate each other. Rather, they complement each other. We believe that the peaceful co-existence of these two programs will add much to the effectiveness of Illinois State University. There is no way in the C&I program that a student wishing to take a balanced plan of mathematics education could take 20 hours of math and 20 hours of mathematics education. The two programs are decidedly different. As you have heard from the Budget Committee, the program is cost effective. Both the Budget Committee and the Academic Affairs Committee have stated that the programs do not duplicate each other. The Sequence in Mathematics Education would allow those students who wish to specialize in mathematics teaching in the elementary and junior high school levels to come and take the program of their choice, a program that they can have designated on their transcript, which will aid them in obtaining employment. It is a different program, a program that will enhance the graduates of Illinois State University.

Mr. Schmaltz recognized Dr. Dan Baxley, Chair of Curr. and Instruction, who said his department had tried to respond to the proposal. In the rationale for the proposal it stated: "the basic core of the Master's Degree program in Curriculum and Instruction no longer permits persons desiring certification as a mathematics teacher for grades 6-8 the 18 hours in mathematics and mathematics education needed to satisfy current state requirements." We contend that up to 24 hours of content specific (both content and pedagogy courses) are available through the Department of Curriculum & Instruction. We have provided student records that show this. We admit that there is some fuzzy wording in college catalogs, and have moved to ameliorate that situation. We feel that there is duplication. The issue of the transcript is not important. Under the new laws in the State of Illinois in that particular situation, the transcript wording is not a particular factor, because the certification office evaluates the transcript and decides through endorsement whether a student can teach more than 50% in a content area. Finally, the issue of sharing programs. He was concerned that the direction we are choosing here may send a signal to his department that we should be careful about sharing programs. The Math Department is excellent and has fine programs. We are now moving in a direction where programs may separate rather than work together. There is an implication from the public evaluating teacher education over the years that we need to move more toward sharing, with content area specialities. If a teacher education department moves to allow strong content area preparation at the undergraduate and graduate level, we may in fact establish a situation where the program later has to separate because the lion's share of the activity exists within a particular academic unit. He did not admit that the Math Department could not provide for those students under the umbrella of the C&I degree. His evidence showed that was possible. He encouraged cooperation between the departments.

XVIII-12 Mr. Shulman moved the previous question. (Second, Kirchner). Motion carried by a 2/3 vote.

XVIII-11 Vote on the approval of the Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6). Ms. Getsi requested a Roll Call Vote. The motion carried: 38 yes; 6 no, with one abstention.

Committee Reports:

Academic Affairs Committee - no report.

Administrative Affairs Committee - no report.

Budget Committee - no report.

Faculty Affairs Committee - no report.

Rules Committee - no report. Ms. Roof called a brief meeting following Senate.

Student Affairs Committee - no report.

Communications:

Mr. Semlow announced that he would like to meet with the student senators who had not attended the student caucus.

Mr. Johnston had heard through the grapevine that some members of the Senate feel that students should not get involved here. He urged senators to talk to him if they had any problems.

XVIII-13 Mr. Thiel moved to adjourn (Second, Ramsey). Motion carried on a voice vote. The meeting of the Academic Senate adjourned at 9:05 p.m.

FOR THE ACADEMIC SENATE

DOUGLAS A. DELONG, SECRETARY

Date: 10/8/86 Volume No. XVIII No. 3

NAME	ATTEN-DANCE	VOTE MOTION # XVII-11	MOTION #	MOTION #	MOTION #	MOTION #	MOTION #	VOICE VOTE MOTION #	Y	N
BELKNAP	P	NO						XVIII-10	X	
BLACKWELL	excused	--						XVIII-11	X	
BORG	P	YES						XVIII-12	X	
DELONG	P	YES						XVIII-13	X	
EICHSTAEDT	P	YES								
FEASTER	P	NO								
GAMSKY	P	YES								
GETSI	P	YES								
HALL	P	YES								
HARDEN	P	YES								
HUBER	P	YES								
INSEL	P	YES								
JOHNSTON	P	NO								
KELLOGG	P	YES								
KIRCHNER	P	YES								
LAVIN	P	YES								
LESCH	P	YES								
LORBER	P	NO								
MC CLERNON	P	YES								
MC KINLEY	P	YES								
MILLS	P	YES								
MORREAU	P	NO								
MOTTRAM	excused	--								
NELSEN	excused	--								
NEWBY	P	YES								
NEWMAN	P	YES								
O'CONNER	P	YES								
O'ROURKE	P	YES								
OSUNA	P	YES								
PASULKA	P	YES								
PETROSSIAN	P	YES								
POOLE	P	YES								
RAMSEY	P	YES								
RITTER	P	YES								
ROBERTS	P	YES								
ROOF	P	YES								
SCHMALTZ	P	ABSTAIN								
SCHWEGEL	excused	---								
SEMLOW	P	YES								
SESSIONS	P	YES								
SHULMAN	P	YES								
SPENCE	P	YES								
STRAND, D.	P	YES								
STRAND, K.	P	NO								
THIEL	P	YES								
WATKINS	P	YES								
WHITCOMB	P	YES								
WOOD	P	YES								
WAGNER	P	YES								
	TOTAL	38 YES								
		6 NO								
		1 ABSTENTION								

SEP 11 1986

September 9, 1986

To: Members of the Academic Senate

From: Academic Affairs Committee

Re: Explanatory Note to Math Education Sequence Proposal

At our September 3rd meeting, the committee voted to recommend to the Senate for approval the proposal for the Mathematics Education sequence in the Masters of Mathematics degree. There was extensive debate during the meeting, however, about interpretation of course requirements in the C&I masters degree, and the potential impact of those requirements on a student's choice between the C&I program and the proposed Math Ed sequence. The committee voted to include this note of clarification as an addendum to the recommended proposal.

The proposal states that under the revised C&I masters program, a student choosing the Junior High/Middle School sequence may elect a maximum of 12-15 hours in mathematics and/or mathematics education. That statement reflects information provided by the C&I department to the mathematics department during preparation of the proposal, as well as information given by C&I representatives to the Academic Affairs Committee at a meeting last May.

During the meeting to consider the proposal, Dr. Baxley, the Chairperson of the C&I department, distributed a letter designed to clarify the confusion about the catalog description of the requirements for sequences of the C&I masters program. In his letter, Dr. Baxley noted that the department intended to revise the wording this semester. The summary comments stated that students in various sequences of the C&I Masters program "may take, with advisement, as many as 24 hours in a specific content area, not including the Culminating Field Experience which, itself, might focus on a special methods area." This option, however, is not identified in any of the written material that is available to prospective or current students, nor on the course planning sheet used by students. Consequently, the Academic Affairs committee felt that the statements included in the rationale for the Mathematics Education sequence reflected the C&I program options that are being offered to students.

9.11.86.6

SEP 11 1986

REQUEST FOR APPROVAL OF A SUBDIVISION OF A DEGREE MAJOR OR CHANGE OF NAME

1. **INSTITUTION**: Illinois State University

2. **RESPONSIBLE DEPARTMENT**: Mathematics Department

3. **PROPOSED SUBDIVISION TITLE**: Sequence in Mathematics Education

4. **PREVIOUS SUBDIVISION TITLE**: Not applicable

5. **CIPS CLASSIFICATION**: 13.1311

6. **DATE OF IMPLEMENTATION**: Fall, 1987

7. **DESCRIPTION OF CHANGE**: The Department of Mathematics currently offers a Master's Degree in Mathematics with concentrations in four areas. The proposed change is that one of these four areas of concentration be identified as a sequence.

MASTER'S DEGREE IN MATHEMATICS	Concentrations: statistics, applied mathematics, computational mathematics, mathematics education.

Figure 1: Current Master's Degree Program in Mathematics

Figure 1 shows the organization of the current Master's degree program in the Department of Mathematics. This program serves two types of students. First, the program serves persons who choose to concentrate in pure/applied mathematics. People with this emphasis usually obtain positions in industry (e.g., actuarial science) or continue their graduate education in a Ph.D. program at another institution. The second group served by this program is secondary mathematics education majors. These people are teachers of mathematics at the senior high school level. The current program requires students to complete coursework in algebra (MAT 317) and analysis (MAT 347). Also, students must take additional coursework in either algebra or analysis, must take a comprehensive examination in one of these two areas, or must give an oral presentation on some original work in an approved area of

9.11.86.6

mathematics. In addition, students are encouraged to complete several courses in one of the concentration areas shown in Figure 1.

Figure 2 shows the organization of the proposed program.

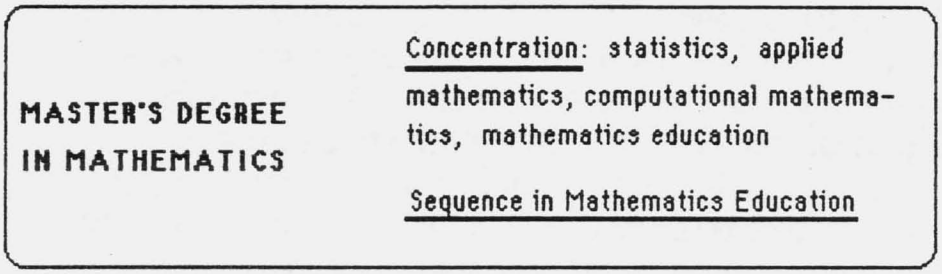

Figure 2: Proposed Master's Degree Program.

No new courses are needed to implement the proposed program, and no additional faculty, facilities, or equipment are needed for the proposed program. Everything needed to implement the proposed program is already in place; the proposed change involves only the formalization of a sequence in mathematics education.

The proposed program uses the notion of a core concept for the sequence. Sequences, by definition, are required to have a substantial core in common with the major, while at the same time being responsive to the needs of those for whom the sequence is designed. The proposed program will meet both of these objectives. The Department of Mathematics proposes that the core requirements be viewed as consisting of student knowledge of major fields of mathematics rather than as specific courses. In particular, the proposed core will maintain the same field requirements in mathematics (i.e., algebra and analysis) as does the M.S. in Mathematics, but will make adjustments in scope for the teaching level of the degree candidate. The addition of this sequence will permit persons interested in the teaching of mathematics at any level (not just senior high school as in the current program) to obtain a master's degree in the Department of Mathematics.

It is also important to note that the proposed sequence continues into the graduate program at the Master's level the clear distinctions between pure/applied mathematics and mathematics education already in the undergraduate mathematics program at ISU. The undergraduate program in mathematics education is strong and has shown substantial growth over the past few years. It is served by a faculty well-known throughout Illinois and the nation and its graduates are sought-after and well-received in schools throughout the state. The dichotomy between undergraduate mathematics and mathematics education majors delineates the speciality of the mathematics education major at that level. The present proposal requests the opportunity to extend this distinction of professional intent into the M.S. degree program in the Department of Mathematics.

8. **RATIONALE FOR THE PROPOSAL**: The Mathematics Department is proposing a sequence in mathematics education in order to meet the needs of teachers of mathematics in Illinois. In particular, there are two major reasons for the proposed change.

(a) Junior high/middle school teachers of mathematics are no longer adequately served by the master's degree program offered in the ISU Department of Curriculum and Instruction. Persons interested in teaching mathematics at the elementary and junior high school levels have, in the past, enrolled in the Master's Degree program in Elementary Education with a content focus in mathematics. This content focus allowed students to take as many as 24 semester hours (out of 32 or 39 hours) of coursework in mathematics and mathematics education. All of the courses for these 20-24 hours were taught by the mathematics education faculty in the Department of Mathematics in the College of Arts and Sciences.

The Master's Degree in Elementary Education is no longer offered by the College of Education. The program available now in the College of Education is a Master's Degree in Curriculum and Instruction. In this program, a student must select one of four sequences. The sequences are: (1) Early Childhood Education; (2) Elementary Education; (3) Junior High/Middle School Education; and (4) Secondary Education.

In this new program the number of hours of coursework in mathematics and mathematics education a student is allowed to take varies with the sequence selected (see Figure 3).

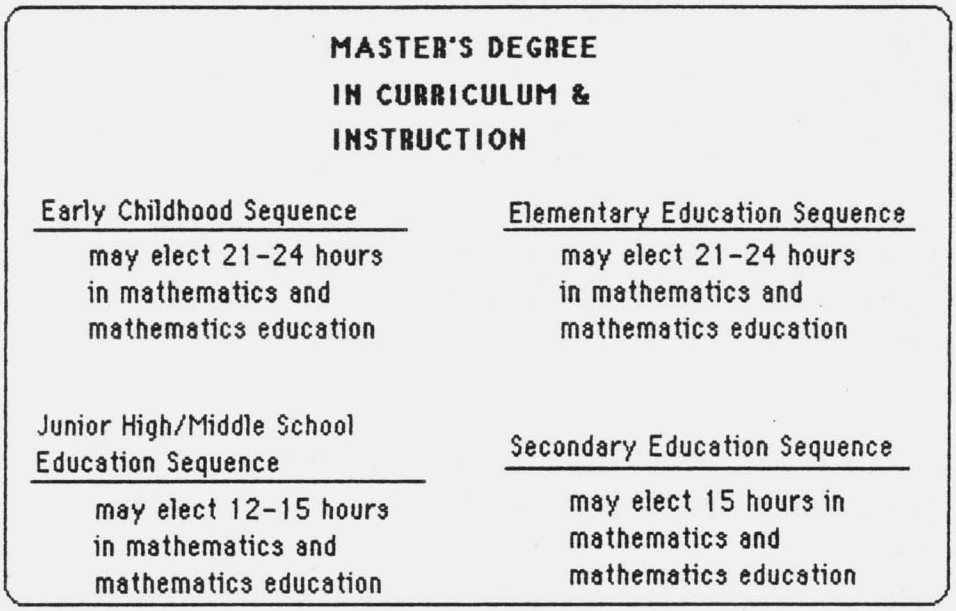

Figure 3: The current Master's Degree Program in Curriculum and Instruction.

Most of the students who enrolled in the previous Master's Degree program in Elementary Education with a content focus in mathematics were teachers with an interest in mathematics at the junior high/middle school level. As a consequence of this program change in the Department of Curriculum and Instruction, persons with an interest in the teaching of mathematics who enroll in the junior high/middle school sequence can now take only 12-15 semester hours of coursework in mathematics and mathematics education. This restriction is less than was allowed in the previous program and, most important, is inconsistent with the recent calls for stronger content preparation for teachers at all levels, especially the elementary and junior high/middle school levels. (See, for example, *Tomorrow's Teachers: A Report of The Holmes Group* and The Conference Board of the Mathematical Sciences report entitled *The Mathematical Sciences*

Curriculum K-12: What is Still Fundamental and What is Not.) Also, this change means that the basic core of the Master's Degree program in Curriculum and Instruction no longer permits persons desiring certification as a mathematics teacher for grades 6-8 the 18 hours in mathematics and mathematics education needed to satisfy current state requirements. The proposed mathematics education sequence allows teachers interested in teaching mathematics at the junior high/middle school grades to obtain a Master's degree from ISU and pursue their area of teaching interest. As noted above, there are no additional courses needed to implement this sequence since all of the mathematics content and mathematics education courses that elementary and junior high school teachers have taken as part of their Master's Degree in Elementary Education are already taught in the Mathematics Department. The proposed sequence simply calls for a reconfiguration of these courses into a sequence in mathematics education.

Because the junior high/middle school sequence in the new Master's Degree in Curriculum and Instruction allows only a limited number of hours from mathematics and mathematics education to count toward the degree requirements, teachers interested in specializing in mathematics at this level are looking elsewhere for their graduate training. For example, during the summers of 1984 and 1985 (and again in 1986), the Department of Mathematics at ISU operated an Honors Teachers summer training program. This program is funded by The National Science Foundation and has served approximately 60 elementary and junior high school teachers who have an interest in specializing in mathematics. At least half of these teachers are interested in pursuing the Master's degree from ISU but will not now do so because of the course restrictions in the junior high/middle school sequence for the Master's Degree program in Curriculum and Instruction. These teachers have taken or will have taken about 24 hours of coursework in mathematics and mathematics education. Were they to enroll in the junior high/middle school sequence of the Master's Degree program in Curriculum and Instruction, many of those hours would not count toward the core requirements for this degree. For this reason, many of these potential candidates for a Master's degree from ISU have stopped taking classes from ISU, and some are looking elsewhere for a Master's degree. Also, the 60 teachers selected for the NSF program were selected from an applicant pool of over 200

teachers. Therefore there is reason to believe that there are many teachers at the elementary and junior high school levels interested in pursuing the proposed sequence in mathematics education.

It is also important to note that students who enroll in the Early Childhood or Elementary Education Sequences in the Master's Degree program in Curriculum and Instruction and take the maximum 24 hours of mathematics and mathematics education (in the College of Arts and Sciences) would have 24 out of the 39 hours (about 62%) of their coursework outside the college overseeing their degree program. Furthermore, the Master's Degree program in Curriculum and Instruction also offers a 32-hour option (Comprehensive Exam Option) and a 26-28-hour option (Thesis Option). Were one to select these options, more than 50% of the student's coursework would be in the Mathematics Department, not the department conferring the degree. When more than half of a student's coursework is in the mathematics department, it seems reasonable that the student's major advisor be in the mathematics department. This seems particularly important if a student elects to write a thesis related to mathematics education. The thesis director should be a professor in mathematics education, and professors of mathematics education are in the Mathematics Department at ISU.

(b) It is becoming increasingly important that people trained in the teaching of mathematics have this specialization noted on their official program transcripts. Persons who emphasize mathematics in the new Master's Degree program in Curriculum and Instruction do not receive any notation on their official transcript indicating that they have special training in the teaching and learning of mathematics. Instead their transcript states that they have completed a sequence such as elementary education or junior high/middle school education. Likewise persons enrolled in the current Master's Degree program in Mathematics who take a "concentration" in mathematics education do not have this emphasis noted on their records. (Areas of concentration do not appear on transcripts.) It seems reasonable that a student whose program emphasized courses in the teaching and learning of mathematics should have this appear in some offical way on the transcript. A sequence in mathematics education would appear on a student's transcript and would draw attention to this specialized

training. Indeed teachers currently taking master's degree courses in the mathematics department tell us that they would like some official notation for their work in mathematics education. They feel that such a reference will help them when they apply for jobs and may influence their salary at a future time. Having this sequence noted on transcripts will draw attention to the specialized training these teachers have received, thus strengthening their credentials.

It was noted above that the proposed sequence utilizes the notion of a core concept for the formal sequence. In doing so, the proposal maintains the present core requirements of algebra and analysis but does not identify specific algebra and analysis courses every student must take. This allows different algebra and analysis courses to be taken by elementary school teachers than are taken by secondary school teachers. The core areas for persons interested in elementary and junior high school mathematics would be satisfied by MAT 304 and MAT 305. The core areas for persons interested in secondary school mathematics would be satisfied by MAT 317 and MAT 347 (as in the current program). Everyone electing this sequence will be required to take MAT 401 and MAT 403. In addition, persons pursuing an emphasis in elementary or junior high school mathematics must complete MAT 304, 305, and 402. Persons pursuing an emphasis in secondary school mathematics must complete MAT 317, 347, either 316 or 407, and three mathematics courses numbered 407 or above. Additional course hours in mathematics, mathematics education, and electives outside the Mathematics Department will be selected in consultation with the student's graduate advisor and will be approved by the Mathematics Department Graduate Director. A summary of these courses is provided in Table 1.

The attached catalog copy provides the full details for the proposed program.

Table 1. Courses involved in the Sequence in Mathematics Education.

• Emphasis in Elementary/Junior High School Mathematics:

MAT 304 Advanced topics in algebra and geometry for elementary and junior high school teachers

MAT 305 Measurement topics for elementary and junior high school teachers

MAT 401 Current research in school mathematics

MAT 402 Instructional strategies in mathematics

MAT 403 Theories of mathematics learning

Additional electives selected from mathematics, mathematics education, and education (e.g., curriculum and instruction)

• Emphasis in Secondary School Mathematics:

MAT 316 or MAT 407 Abstract Algebra

MAT 317 Linear algebra

MAT 347 Introduction to real analysis I

MAT 401 Current research in school mathematics

MAT 403 Theories of mathematics learning

Additional electives selected from mathematics, mathematics education, and education (e.g., curriculum and instruction) with at least three mathematics courses numbered 407 or higher

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9. EXPECTED IMPACT OF THE PROPOSAL ON EXISTING CAMPUS PROGRAMS : The proposed sequence will have a positive impact on the Master's Degree program in the Department of Mathematics. As noted above, there already exist a significant number of teachers desiring this sequence in mathematics education. A large increase in the enrollment in the Master's degree in mathematics would be expected due to students entering the elementary/junior high school track in the proposed sequence. The proposed sequence should have minimal impact on existing M.S. programs other than the M.S. in Curriculum and Instruction. Its effect on the latter program is unclear. Some students who might currently opt for the M.S. in Curriculum and Instruction will undoubtedly view the sequence in mathematics education as more attractive and appropriate for their career goals. However, it is quite likely that the sequence in mathematics education will result in an increase in the number of students enrolling in certain

courses taught in the Department of Curriculum and Instruction. If the sequence in mathematics education attracts more graduate students to ISU, as we feel it will, many of these new students will enroll in courses in Curriculum and Instruction as part of their degree program in mathematics education.

Because the Departments of Mathematics and Curriculum and Instruction are currently offering distinct programs for persons interested in secondary education, there is no reason to suspect that separate programs for persons interested in elementary and junior high school education cannot coexist as viable programs. Indeed the existence of the proposed sequence in mathematics education will provide students a choice between a program that is heavily oriented toward mathematics and a program that permits some specialization in mathematics but is primarily directed toward more general pedagogical concerns.

10. EXPECTED CURRICULAR CHANGES INCLUDING NEW COURSES: All courses required in the proposed sequence are already in place as are all elective mathematics and mathematics education courses.

11. ANTICIPATED STAFFING ARRANGEMENTS: Staffing arrangements effective in 1985-86 are adequate to staff the proposed program. The Mathematics Department has 13 faculty with either the Ph.D. or Ed.D. in Mathematics Education. This is the largest collection of mathematics educators at any university in the United States.

12. ANTICIPATED FUNDING NEEDS AND SOURCES OF FUNDS: Current funds are adequate. The Department has been teaching the required and elective courses on a regular basis for several years.

Proposed 1987-88 Graduate Catalog copy pertaining to the proposed sequences in Mathematics and Mathematics Education

Programs Offered

The Department of Mathematics offers varied programs leading to the Master of Arts, Master of Science and Doctor of Arts degrees. At the master's level, a Sequence in Mathematics Education is available, along with concentrations in pure mathematics, statistics, computational mathematics, and applied mathematics. A doctoral program is offered to persons seeking advanced training for teaching in two-year and four-year colleges. Teaching assistantships and instructorships are available.

Master's Degree Programs

The student must meet the general university requirements listed elsewhere in this catalog for either the Master of Arts or Master of Science degree. In addition, the student must complete one of the two options in pure and applied mathematics or one of the two options in the Sequence in Mathematics Education. The Graduate Record Examination General (Aptitude) Test or the Advanced Test in Mathematics is required for admission.

Options in Pure and Applied Mathematics

Two options, requiring 39 and 32 hours, are available. Entering students must have completed an undergraduate mathematics major. Before completion of the master's degree, the student must complete MAT 317 and 347. A student must also select and complete either of the following two options:

Option I: At least 30 of the 39 hours required must be in mathematics. At least 18 of the 39 hours must be at the 400 level, with at least 12 of these in mathematics, including at least one course in algebra or analysis. Neither a thesis nor a comprehensive examination is required, but the student must maintain a 3.2 grade point average.

Option II: At least 24 of the 32 hours required must be in mathematics. At least 15 of the 32 hours must be at the 400 level, with at least 10 of these in mathematics. One of the following is required: a written examination over two areas, one of which must be algebra or analysis, or an oral presentation on a topic the student has investigated under the direction of a faculty member.

Areas of Concentration

There is considerable room for flexibility in selection of elective courses. The Graduate Advisor will assist students in selecting electives in the following areas of concentration.

Further graduate work in mathematics: 349, 407, 408, 447, 448, 449, 475, 476.
Statistics : 351, 356, 368, 450, 452, 453, 455, 456, 458.
Computational mathematics: 356, 360, 361, 363, 366, 368, 370.
Applied mathematics: 340, 341, 345, 349, 356, 360, 361, 362, 363, 366, 368, 370, 378.

Other courses not yet listed in this catalog are also available. Contact the Graduate Advisor.

Sequence in Mathematics Education

Individuals who are teaching or who plan to teach in public and private schools may wish to complete one of the two options in the Sequence in Mathematics Education. A program for each entering student will be designed in consultation with the graduate advisor to bring the student's credentials in content and methodology to a level appropriate for the needs of the student and the demands of the teaching profession. Each student electing this sequence must complete MAT 401 and 403. In addition, persons pursuing an emphasis in elementary or junior high school mathematics must complete MAT 304, 305, and 402. Persons pursuing an emphasis in secondary school mathematics must complete MAT 317, 347, either 316 or 407, and three mathematics courses numbered 407 or above. One of the following options must be selected and completed.

Option I: At least 30 of the 39 hours required must be in mathematics. In addition, at least 18 of the 39 hours must be taken at the 400 level, including at least 12 in mathematics. As a culminating experience, the student must conduct a research project and report the results in a colloquium. This project, which will be completed under the supervision of a graduate faculty member, must relate to the teaching of school mathematics and reflect the integration of mathematics teaching methods and mathematics content.

Option II: At least 24 of the 32 hours required must be in mathematics. In addition, at least 15 of the 32 hours must be taken at the 400 level, including at least 10 in mathematics. As a culminating experience, the student must complete either a written comprehensive examination or an approved thesis with no more than six hours of credit in Mathematics 499.

The Mathematics Department also cooperates with the Department of Curriculum and Instruction in the design of programs for elementary, junior high, and secondary teachers who elect the Master's Degree in Curriculum and Instruction.

ACADEMIC SENATE MINUTES

October 8, 1986 Volume XVIII, No. 3

CONTENTS

Meetings of the Academic Senate are open to members of the University community. Persons attending the meetings may participate in discussion with the consent of the Senate. Persons desiring to bring items to the attention of the Senate may do so by contacting any member of the Senate.

ACADEMIC SENATE MINUTES

(Not approved by the Academic Senate)

October 8, 1986 Volume XVIII, No. 3

Call to Order

Chairperson Len Schmaltz called the meeting of the Academic Senate to order at 7:05 p.m. in the Circus Room of the Bone Student Center.

Roll Call

Secretary DeLong called the roll and declared a quorum present.

Approval of the Minutes of September 24, 1986

Mr. Spence had the following corrections to the minutes of September 24, 1986:

Page 11, twelfth line from the bottom of the page should read: "He responded to comments from Sen. Feaster.

Page 12, first paragraph, sixth line should read: "Of these, 12 hours in Area II must be courses involving pedagogy. That means that out of 24 possible maximum hours, only 12 hours of mathematical content courses could be elected."

Page 13, fifth paragraph, line 17 should read: "At some schools like...". The last paragraph on Page 13, first sentence, the wording should be: "...they had been provided when C&I changed theirs in 1985."

Page 15, fifth paragraph, fourth line should read: "specifically to teaching mathematics as opposed to requiring course work..."

Mr. Ken Strand had a few editorial changes, which were incorporated.

Mr. Lorber stated that Page 8, last paragraph, ninth line should read: "departments, rather than try to provide all the separate instructional focuses."

On Page 9, fifth paragraph, last line should read: "in the catalog that is not clear."

XVIII-10 Mr. Thiel moved to approve the Minutes of September 24, 1986 (Second, Eichstaedt). Motion carried on a voice vote.

Chairperson's Remarks

Mr. Schmaltz announced to the Senate that Academic Senate Secretary, Mary Edwards, was honored by one of the Civil Service Merit Awards. He thanked her for all her efforts for the Senate.

The chair stated that some senators were aware that Senator Getsi's daughter had been stricken with Guillaine-Barre disease last year, and would be the subject of a 4-day series about her recovery in The Pantagraph. The series would run this Sunday, and on Tuesday, Saturday and Sunday of the following week. Senators might be interested in the details of the progress she has made. Ms. Getsi would like to have extra copies of the articles sent to her in the English Department, if anyone wishes to save them.

Vice Chairperson's Remarks

Mr. Semlow had no remarks.

Student Body President's Remarks

Mr. Ritter stated that the Student Body Board of Directors has concluded the first half of the voter registration drive. They secured 2,500 student registrations during the first four weeks. During the 5-week period in November they hoped to reach a goal of five to seven thousand voter registrations.

Administrators' Remarks

Mr. Watkins announced that a search committee was being formed to select a new Dean of Continuing Education and Public Service. Dr. Bernard McCarney, Economics, had been chosen from the Panel of Ten to serve as Chair of this committee.

He commented on the professional way in which the University community had handled the collective bargaining election on October 1st. There should be a sense of pride in the way the election had been conducted.

Mr. Strand had no remarks.

Mr. Gamsky had no remarks.

Mr. Harden had no remarks.

ACTION ITEM

Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6)

Ms. Dixie Mills, Chair of the Academic Affairs Committee, introduced the proposal for a Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education. She attempted to focus the issues and synthesize the information her committee had gathered. She believed the Senate needed to address three questions: 1) Whether or not the Mathematics Education Sequence was consistent with the goals of the University? 2) Whether or not it offers a distinct academic option to students? 3) Whether or not it is a cost effective program?

She addressed the second question first. (Does this proposal offer a distinct academic option to students?) The objectives of the Math Education Proposal are to serve teachers of mathematics and to provide content courses focused at certain teaching levels. She had gone to two sources for information about the Curriculum & Instruction program: the original program proposal and the Provost's Review of the Department last year. The original proposal addressed other questions, so she relied heavily on the program review. In the program review, three of the four objectives in the program addressed pedagogical issues. The one that would more closely address a specialized area is: "to provide additional preparation in specialized areas." Others addressed curricular issues: to emphasize basic understandings and concepts in classroom management, research methodology, and human growth, development and curriculum theories; and secondly, to provide practice in the planning of educational objectives, implementing programs, designing instructional strategies, and using research and evaluation techniques; and the fourth is to focus on issues, trends, and research in education. Mr. Baxley provided some information about the C&I degree in the catalog description. The degree has four elements: a core of basic studies that is 12 hours; a set of courses designated special techniques that involves 12 hours; directed electives of 12 hours intended to be in the teaching field; and a culminating field experience of three hours. The question is whether the C&I program is designed to meet the same objectives as the Mathematics Education Sequence if it were approved. She did not think it was, for several reasons: 1) In the C&I program, the focus is more on general pedagogy. 2) If a student does not take the 12 hours of special techniques as designated or suggested, then he is not taking part in the C&I sequence in which he is enrolled (in the Jr. High/Middle School Sequence there are several courses in general.) First of all, the special techniques area, Area II of the program as described in the program review has as its purpose to present planning of educational objectives, implementation of programs, use of instructional strategies, and implications of research and evaluation of pupil outcomes. Suggested courses are: The Classical Functions of Jr. High; Curriculum in Jr. High/Middle School; Methods, Patterns and Issues in Early Adolescent Education; and Reading in the Content Areas. If a student does take as many hours in Mathematics as we were told that they could take, then they would take none of the courses in C&I, and they would also take their culminating field experience in Mathematics. Another reason that this program is not the same is because when we first looked at this program last May we were told that a C&I candidate could take only 15 or a maximum of 18 hours in Mathematics in the C&I Master's Program. The final reason is that most of the plans of study given as examples at the last meeting were in fact dated prior to the implementation of the C&I program in the Fall of 1984. Many of the plans of study were not for students enrolled in the new C&I program. She believed that for all the reasons above these two programs were not the same. Another question is whether the Math Education Sequence is consistent with the mission of the university. The University Mission Statement in the Academic Plan states as one of its priorities: "to provide master's degree programs which are among the best of the public institutions in Illinois...." It goes on to say that we will support certain kinds of Master's programs. "The University will initiate new master's....when societa need, faculty capability, and adequate funding are firmly established." She be lieved that these characteristics had been demonstrated. The mission also states

that "Existing faculty qualifications and intersts are demonstrably adequate to support a program with valid and distinctive goals." From the information presented at the last Senate meeting, we can see that the faculty meets that issue. The two goals for students graduating from the program: "as academic researchers or as post-graduate practitioners, have skills demonstrably consistent with relevant professional standards" and that "the research, creative activity, and professional practice performed by students and faculty meet relevant professional standards" will remain to be seen. The last goal that "the benefits of the program, defined in terms of the educational, research, and public service needs of the State of Illinois, are proportional to the incremental costs of the program," would be met as there is no added cost. Other criteria would be met such as: "they are developed from an area of academic importance, and/or they enhance academic quality; they are (or, have) developed from an area of excellence, they have developed to address student interest and/or societal need through distinctive and clearly perceived goals; they have developed with adequate funding potential (no funds needed); and they have developed with evidence of long-term benefit to the University. As to the cost effectiveness, the Budget Committee would be giving a report on that. The Academic Affairs Committee urged that the Senate act on this proposal this evening.

XVIII-11 Ms. Mills moved approval of the Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6). (Second, David Strand).

Mr. Ramsey reported from the Budget Committee. He stated that in the Math Education proposal there was no budgetary data. University guidelines do not require that a sequence have budgetary guidelines. The Budget Committee would be looking into this. This is a zero cost sequence, it will impose no costs on the University. The enrollments are not sufficiently great to exceed existing class size. A slight increase in tuition and fees might happen. The budgetary impact is virtually zero. The budgetary impacts on the C&I program would be approximately the same, with no impact. The Budget Committee concluded that the budgetary impacts of the proposed Mathematics Education Sequence were zero. The same conclusion applied to the summer school and academic year budgets.

Mr. Lorber referred to the Math Proposal, Page 3, Section 8. Rationale: (a) Junior high/middle school teachers of mathematics are no longer adequately served by the master's degree program offered in the ISU Department of Curriculum & Instruction." He then referred to the modified copy of the catalog entry that clearly indicates that students can take the same courses they were able to take prior to that change. The plans of study that were distributed for the information session dated from 1984--1986 and demonstrated that the advisement students have been receiving has been consistent for them to take that number of hours. He felt this was no longer an issue. The number of hours students can take in the Math Ed. Sequence would replace the same number of hours in the C&I program. The same sequence proposed by Math could be taken in the C&I Masters Program. The issue is no longer that the students can not take the number of hours they need in Math--they can. The second point of the rationale: "It is becoming increasingly important that people trained in the teaching of mathematics have this specialization noted on their official program transcripts." is a value call. Having a list of courses on the transcript is not enough to enable the potential employer to make a decision. It would be more meaningful for that

statement to have said Math Sequence.Perhaps this would be true, perhaps not. If you were hiring a Math teacher, would that make a significant difference, or would you look for course content and the courses that the person took. A third issue has arisen about the openess with which all departments can approach the curriculum revision process; the extent to which we can try to meet the needs of students by calling on the expertise within the various departments. To the extent that this proposal is worded, it sends a fairly clear message not only to C&I, but to every department on campus, that if you try to be open and capitalize on the expertise of other departments, you run the risk of other departments developing their own programs and taking the whole thing from you and no longer have a sharing operation, but a taking operation. It may not happen in every case.

Mr. Spence referred to a document he had distributed to senators' places this evening entitled "Sequence in Mathematics Education". A typographical error appeared in the fifth item, it should read April, 1986. He outlined the history of the proposal. The Academic Planning Committee had previously endorsed the concept of a sequence in mathematics education within the Department of Mathematics. In fact, this program is mentioned in the 1985-1990 Academic Plan as a new program under development in the Department of Mathematics. This Academic Plan was presented to the Academic Senate on November 28, 1984.

After the inclusion of the sequence in mathematics education in the 1985-1990 Academic Plan, the Department of Mathematics began to develop a specific proposal. When the proposal was completed in October of 1985, John Dossey (the Acting Chairperson of the Mathematics Department) discussed it with the Chairperson of the Department of Curriculum and Instruction. At the same time, the proposal was submitted to the Curriculum Committee of the College of Arts and Sciences, where it was subsequently passed unanimously and sent to the Graduate School. After receiving approval from the Graduate Curriculum Committee, the proposal was forwarded to the Graduate Council. In the course of its deliberations, the Graduate Council requested input from the Department of Curriculum and Instruction, but was told that there would be none. The Graduate Council then passed the proposal at a meeting on April 10, 1986, without a single negative vote from the thirteen members in attendance. Be aware that as of this time no objections to the concept of this sequence had been raised by anyone, including the two members of the Graduate Council from the Department of Curriculum and Instruction.

After being passed by the Graduate Council, the proposal was forwarded to the Academic Affairs Committee of the Senate. At this time the Department of Curriculum and Instruction objected to certain statements in the proposal that they felt misrepresented their program. On the basis of information provided to the Academic Affairs Committee in May by the Department of Curriculum and Instruction, the proposal was rewritten. This version of the proposal is the one under consideration tonight. However, at the Academic Affairs Committee's next meeting on September 3, 1986, the Department of Curriculum and Instruction charged that the revised proposal also misrepresents their program, even though the revision accurately reflects the information they had previously given to the Academic Affairs Committee. (The cover letter on the proposal documents this statement.) Moreover, for the first time, the Department of Curriculum and Instruction claimed that this proposal duplicates their program. Note that this claim was made 22 months after the proposed sequence was first announced to the Academic Senate, five months

it was first considered by the Academic Affairs Committee.

These objections were given thorough consideration by the Academic Affairs Committee, which voted to forward the proposal to the Senate for approval. Of the members of the Academic Affairs Committee who participated in the voting, only Senator Lorber, a member of the Department of Curriculum and Instruction, voted against the proposal. Thus this proposal has passed through the Graduate Council and the Academic Affairs Committee with only one negative vote from the eighteen persons who voted on it.

Rationale for the Sequence in Mathematics Education: This proposal addresses a serious national problem, the scarcity of persons who are adequately prepared to teach mathematics at the elementary and middle school grades. The seriousness of this problem has been recognized at the federal level by the National Science Foundation, which recently set aside $6 million to develop model programs for the preparation of prospective middle-school teachers in mathematics and science. We at ISU can be proud of the fact that two of our mathematics education faculty, Alba Thompson and Carol Thornton, were selected to receive one of these grants, worth $744,300. The proposal before us provides a means for attacking the scarcity of qualified mathematics teachers in another way. Unlike the Thompson/Thornton grant, which forcuses on preparing prospective teachers, this proposal will provide a means of current teachers to upgrade their knowledge of mathematics content and pedagogy by concentrating their graduate work in the field of mathematics education.

In speaking of Mathematics Education as a Discipline, Mr. Spence stated: In the last twenty years mathematics education has come to be recognized as a separate discipline, distinct from both mathematics and general education. Graduate programs in mathematics education exist at many institutions of higher education, including all of the Big Ten schools, Stanford, Columbia, and Forida State University, the University of California at Berkeley, and the Universities of Texas, Maryland, and Virginia. At the University of Georgia and the University of British Columbia, there are separate Departments of Mathematics Education. Further evidence that mathematics education is a separate discipline is provide by the existence of journals devoted solely to this discipline (e. g. the Journal for Research in Mathematics Education and Educational Studies in Mathematics.

Illinois State University can take pride in its mathematics education faculty, all of whom are members of the Department of Mathematics. Not only do these faculty comprise the largest collection of mathematics educators at any one institution in the United States, but many of our faculty are nationally recognized as outstanding scholars and leaders in this field. ISU has an outstanding undergraduate degree program in mathematics education which has been offered as a separate major since 1979. The quality of this program is well-known in Illinois and is reflected in the eagerness with which our graduates are sought by school districts from throughout the state.

The proposal under consideration seeks to establish a sequence in mathematics education within the existing master's degree program in mathematics. This proposal builds upon the strong undergraduate major in mathematics education and the current mathematics education concentration in the master's degree program in mathematics. This concentration is presently available to persons interested in specializing in mathematics teaching in the secondary schools.

Our proposal seeks to extend the current program to persons interested in specializing in the teaching of mathematics at the elementary and middle-school grades.
It is important to understand that this proposal is not a replacement for the existing program in the Department of Curriculum and Instruction. Instead it provides students interested in mathematics teaching an opportunity to select a program focusing on mathematics content and pedagogy as an alternative to the more general program in the Department of Curriculum and Instruction.

Some Senators have suggested that passing this proposal will create a precedent by establishing a master's degree program that has as its objective the preparation of teachers with a subject-matter specialty. In fact, such programs already exist on this campus. For example, there is a master's degree program in Business Education within the College of Business, programs in Art and Music Education within the College of Fine Arts, and a program in Educational Psychology within the College of Arts and Sciences. Just as programs coexist with sequences in the Department of Curriculum and Instruction, we believe that the proposed emphases in elementary and middle-school mathematics will coexist with the corresponding sequences in the Department of Curriculum and Instruction.

Certainly our program will be quite different from theirs in several important respects. For example, the Department of Curriculum and Instruction restricts its students to at most 24 hours in the Mathematics Department, whereas the present proposal requires 30 hours in the Mathematics Department and allows students the option of taking all of their hours there. Moreover, as we learned at our last Senate meeting, the Curriculum and Instruction program restricts a student to at most 12 hours of mathematics content, whereas in the proposed sequence a student selecting the 39-hour option can obtain as many as 30 credits of mathematics content. This flexibility is necessary to satisfy the increasing call for teachers of elementary and middle-school mathematics to have stronger backgrounds in mathematics content. (John Dossey spoke to this issue at our last meeting.) Moreover, the present Illinois State Board of Education requirements for recognition as a full-time mathematics teacher for grades 6-8 require 15 hours of mathematics content, more than can be obtained in the Curriculum and Instruction program. Furthermore, our proposal will permit students to write theses and to take comprehensive examinations in their chosen specialty, mathematics education, these options are not possible in the Curriculum and Instruction program.

The Math Department believes that the sequence in mathematics education will attract new students to this university. Students wishing a graduate degree in mathematics education will be attracted to ISU because of the excellent reputation of the mathematics education faculty. In fact, the very existence of two programs, one in the Department of Mathematics and the other in the Department of Curriculum and Instruction, may attract students because they will be able to sample both programs before committing to either one. For this reason

we expect that this proposal will eventually have a positive effect on enrollments in both departments.

In summary, this proposal clearly meets the criteria for new programs set forth in the Academic Plan. It is a natural extension of the existing undergraduate major and master's degree concentration in mathematics education, it attacks the serious national shortage of adequately prepared mathematics teachers, it provides students another program option, and it can be achieved at no cost to the university. It should be passed.

Mr. Insel spoke as an "independent" mathematics senator. He expressed his personal viewpoint that this was a quality program. Having a child of Junior High age, he was especially interested in the quality of teaching at the elementary and junior high levels. He thought it very important for mathematics teachers to be prepared in content areas. He pointed out that in the substitution of 12 hours of special technique courses for pedagogy courses in the C&I program, John Dossey had cited a case of a student who did substitute mathematics courses and when it came time to take the comprehensive examination, she was tested on the material contained in the C&I courses which she had not taken. This student was not able to make the substitution satisfactorily, and has left the University.

Mr. Ken Strand said that he first would like to make clear that he had no problem with the professional credentials, abilities, and reputations of the math educators in the Math Department. He primarily wanted to deal with the manner in which evidence was provided in this case. He wanted reconsideration of Mr. Insel's previous comments since they were based on a sample size of one. He wanted reconsideration of Mr. Spence's comments about the big name institutions in which mathematics education is housed in the Math Department. Mr. Strand stated that the sampling was biased--no mention was made of the big name institutions in which mathematics education is not housed in the Math Department. No mention was made of the proportion of math education programs that are housed in the Math Departments of big name institutions.

Mr. Strand stated that his concerns about supporting evidence were related to appropriately serving student needs--as was a point of concern in the previous Senate meeting by Mr. Feaster, Mr. Johnston, and others. The concerns relate to a possible threat of departments and colleges being open game to one another. They relate to possible university instability. Mr. Strand stated that he was not suggesting that the threats would likely occur, but that little research-level effort was provided to suggest that the threats would not occur. He further stated that many of the senators knew that he taught research and statistics courses. He stated that sources of knowledge include authorities and the scientific method. At least many researchers would support a point of view that the latter provides more valid information than do authorities, even though the two are related. But experts have been incorrect time and time again, as have researchers--but likely more so for the experts than the outcomes of the research process. The Math Department provided convincing expert testimony. However, he was concerned that a more scholarly approach had not been taken relative to supporting claims. Little data and results of scholarly study had been provided. No analysis was made of possible repercussions--for example, the impact on personnel decisions within the Department of Curriculum & Instruction if the item is passed. Claims

that were based on biased sampling were provided. He stated that the preceding is especially noteworthy since this institution is on a new thrust toward scholarly productivity and evaluation, and that this institution has had an institutional research office for several years--in which several full-time people are employed to perform research regarding issues that are often analogous to the current item.

Mr. Wagner, as a student senator, asked Mr. Lorber about evidence that shows this will hurt the students' options. Mr. Lorber replied that the options available to students should be as wide as possible. The University has an obligation to avoid duplicate programs that don't really offer new options. Our contention is that the courses that the Math Department is proposing to include in the Master's program are already available to students through the C&I program. In other words, you as students could take those same courses in the program that already exists. So, therefore, there is really not a new option at all. It is the same option, but in a different program, in a different department. Another point concerns the extent to which the University wants to be training specialists. We have a precedent in the medical profession where they specialize about as far as they can go. But, they have now started to swing back and there are many general practitioners and family practice physicians being graduated now. There is a recognition of the need to have a larger picture than just the person's left foot. The same kind of issues pertain to education. On a school faculty you don't want people who are solely trained in Mathematics and unaware of the needs of the English faculty, or Art faculty. That kind of specialization is counter-productive. One of the nice things about the College of Education Core curriculum is that we have Math people, English people, and Social Science people sitting together discussing curriculum development and trying to see the school curriculum through a different set of eyes as different people express their ideas. That whole thing will be eliminated if all the programs are taken in Math Department, or within the English Department or in any other single department. You are narrowing your perspective. That in terms of public education is counter-productive.

Mr. Morreau appreciated the listing of events. He suggested that there were two terms to look at in analyzing a situation like this: 1) turf-building, and 2) turf maintenance. He was not interested in turf maintenance. Building and expanding programs should have a viable case. A difference in objectives does not dictate the means by which differences in objectives can be met. Differences in objectives might be met by one program as contrasted to two. We are talking about a program that needs no new courses, no new dollars, no new people to teach courses. If you need nothing, how can you have a program. If all the things are already present, how is it a new program. Going one step further, if the students in the C&I department are not denied professors in the Math Department, or resources in the Math Department, then in essence they have access to the same resources in C&I as they have in Math. There are problems in the present system and those problems are readily evident. There are communication problems as well as others. We heard of advisement problems, problems with handling of transcripts, problems with comprehensive examinations, problems in thesis advisement, problems in certification requirements, problems in number of courses required to take. Each of the problems being addressed have also been

addressed from 150 miles away at Northern Illinois University where we have a cooperative program entitled Regency Doctoral Programs, but they are dealt with cooperatively because we sit down and face the issues, and establish policies between two agencies. Statements that data had been biased regarding student interest and student need may or may not be true. He thought there was a communication problem between departments that needed to be addressed. He thought that the proposal should go back to the departments with the request that they work together to resolve their differences.

Mr. Belknap asked if the current C&I sequence met state certification standards. He had received the answer at the last Senate meeting from C&I that yes, they did. Mr. Spence had produced evidence that "No, this could not occur." He addressed his question to Curriculum & Instruction: Does C&I's program meet state certification standards?

Mr. Lorber deferred to Dr. John Crotts from the Department of Curriculum & Instruction. Mr. Crotts said at the Master's level there is no certification. It is possible under today's certification law for an individual student to gain undergraduate certification concurrently with graduate level work. If a student comes into the C&I program and wants to gain certification at the graduate level, he can not do that. He must go back and do the undergraduate sequence, then begin graduate level work. The second point that was raised was that Grades 6-8 teachers must have 18 hours of pure math. That is possible in any program sequence in Curriculum & Instruction.

Mr. Spence said there was a problem with the wording. The word certification was not exact. He had avoided that word in his previous remarks. The present law in the State of Illinois says that if you are teaching Mathematics in Grades 6-8 and if the teaching of mathematics is 49% of your work load, then anyone who is a certified teacher can teach mathematics with no content background whatsoever. However, if your teaching is 50% or more in a content area then you must meet certain specific requirements. For Grades 6-8 for "Recognition as a half-time or more mathematics teacher" you must have completed 18 hours of mathematics education, including 3 hours of pedagogy, and 15 hours of content. For Grades 9-12, the secondary standards are much higher. Professor Crotts has maintained that 18 hours of content are possible in the C&I program. At our last meeting we heard from Sen. Lorber that that was not the case. This is an example of the contradictory information that has been prevalent. According to the minutes of our last meeting, the 12 hours of course work in Area II under the C&I program (Special Techniques) must be in pedagogical related courses. If that is the case, and a maximum of 24 hours can be taken in the Mathematics Department, there is no way that a student can receive 15 hours of math content courses. Twenty-four minus 12 does not leave room for 15. It is impossible to meet the State of Illinois Board of Education's requirements for recognition as a half-time or more mathematics teacher by taking all of the course work through the C&I Department.

Mr. Lorber asked if the document referred to was not for Math teachers alone. (Yes). He felt that we were talking about undergraduate programs with the fifteen hours of math content requirement. Mr. Spence said it referred to recognition by the State of someone who is half time or more teaching mathematics in Grades 6-8. It did not pertain to certification of elementary education teachers. It pertained to recognition by the State.

Mr. Lorber said that was exactly what the C&I department graduated from their four year undergraduate program.....people who then get certified to teach Mathematics. We were addressing a Master's Program. We were not addressing

the issue of a number of hours required. The people who are coming back at a Master's level are coming back with their teaching certificates and have met their requirements. We are talking about one level up. People that are coming back to be re-trained or pursue a Master's level program. They have their certification already. We are talking different things here. You're talking about people who are certified by the state to teach Mathematics in the public schools; and we are talking about people who graduate from four-year institutions. In 1988, they will have to pass a competency test. That's what we are talking about when we mention 15 hours. Let's not confuse the issue. This proposal is something entirely different than that. We are talking about a proposal at the Master's level. Let's not mix pears and oranges.

Mr. Spence disagreed with Sen. Lorber. The students being referred to were those who were returning for graduate study who do not satisfy the state requirements for recognition and wish to do so within the graduate program. At ISU last summer the math department ran such a program specifically for individuals like this. Students took the course work specifically to meet state requirements for recognition. When the rules were recently put into effect, there was no "grandfather clause". Anyone who moves from one district position to another could trigger these new standards. So someone who had a general undergraduate background, and was teaching at the middle school level, but teaching primarily mathematics, if they move from one district to another, or even within the same district these new rules come into effect. They would not be able to meet the requirements set forth to be recognized as a half time or more mathematics teacher.

Mr. Johnston said he agreed with Mr. Morreau's statement that the departments communicate and cooperate more. He wondered if the positive aspects of this proposal outweighed the negative aspects. He felt the data was confusing. If he voted yes, it would look like he was for the Math Department; if he voted no, he would be for the C&I department. He was for neither department. He felt it should be thought out more, and if the data is not clearly there, it should not be voted on.

Mr. Shulman spoke in favor of the proposal.

Mr. O'Rourke asked about the certification of a person to teach 50% or more in mathematics, including 15 hours of course work in mathematics content. Does that include undergraduate credit hours?

Mr. Spence said this could include undergraduate hours or hours obtained at another institution. There are plenty of persons now teaching at the middle school range who do not have any of these hours, and because of a move or re-location, would need to satisfy the new state requirements that have gone into effect only recently. Although it is true that teachers can count undergraduate hoursfor that, it is also true that people do not have those hours to count. We are talking about content courses like Calculus, Modern Algebra, Number Theory, Geometry, Computer Science, Probability and Statistics, etc. These are fields that not every person teaching at the elementary or middle school grades has background in.

Mr. O'Rourke asked if a person could graduate from a state school in Illinois, and become a teacher without having these math content courses. Mr. Spence answered yes.

Mr. Lorber answered, Yes. It was unlikely that an English teacher would be coming back to take a Math sequence. We are talking about Math teachers, those people who have had those 15 hours of Math. It would be quite possible for them to meet the current requirements under the current C&I Master's program. He yielded the chair to Dr. Baxley, Chair of the C&I Department. Dr. Baxley said teachers are certified with an undergraduate degree in the State of Illinois. They can be "endorsed" to teach in specific areas which the 18 hour requirement refers to.

Ms. Getsi yielded the floor to Alba Thompson of the Math Department. Ms. Thompson said that there may be a teacher teaching at the seventh grade level full-time mathematics, that teacher has been certified, he has a general elementary education certificate that certifies him to be teaching. According to the new law, however, that teacher is not qualified to be teaching Mathematics full time. Even though that teacher has received a certificate from the state because he went through an undergraduate program that fulfilled the requirements for certification at the elementary school level, that does not mean that the new laws concerning recognition will enable him to do this. There are many people teaching at the Jr. High level who are not well qualified even though they are certified. While they are certified, they are not qualified in the subject matter area. The new law states that a person teaching 50% or more in a content area will have to meet recognition standards. If they seek a new position elsewhere they will have to meet these standards, even though they are certified.

Mr. Schmaltz asked what happened to a person who continued to teach 49% of the time, and does not switch positions. Ms. Thompson said that under the law they could continue to do this. It was the 50% or more who were affected.

Mr. O'Rourke clarified that if a teacher at that level in Illinois who went through an undergraduate program without specific math content in their courses, in order to qualify for a new position teaching mathematics, would have to have 15 hours of math content? Ms. Thompson said 15 hours of math content and a three-hour pedagogy course.

The Senate recessed for 10 minutes.

Mr. Thiel looked at the proposal in the way it would affect students. He saw that it would affect students positively. He did not see that the proposal offered the same program currently housed in the C&I department. There is more emphasis on content, which was needed. It would appeal to two different audiences. ISU students would be more marketable if they chose to take this program. This would attract students to this university. This proposal is positive to students.

Ms. Getsi commented that there seemed to be some incredulity from senators that people could actually be certified to teach with no math courses at the college level at all. She knew for a fact that it was true. A parallel situation exists in English. There are teachers being certified who teach language arts and have only taken English 101 merely because it was a universal requirement for the university.

Mr. Schmaltz recognized Dr. Al Otto, Chair of the Math Department, who stated that all of the courses and faculty for Mathematics Education reside in the Math Department. The concept of this degree was approved by the Academic Planning

Committee to be in the 1985-90 Academic Plan. The Academic Plan is the way the University communicates to the Board of Regents their plan for the future. Apparently the Academic Planning Committee felt that a Master's Degree with a Sequence in Mathematics Education was consistent with the Mission of the University. On the issue of communication, he reminded the senate that Dr. John Dossey, former chair of the Department of Mathematics, talked to the chair of the Department of C&I concerning the proposal in Mathematics Education. According to Dr. Dossey, she did not indicate any opposition to the proposal. What they were asking for was a proposal to give students another choice--a decidedly different choice. The emphases and purposes of the program in Mathematics Education are decidedly different from those of the program in Curriculum and Instruction. These two programs do not duplicate each other. Rather, they complement each other. We believe that the peaceful co-existence of these two programs will add much to the effectiveness of Illinois State University. There is no way in the C&I program that a student wishing to take a balanced plan of mathematics education could take 20 hours of math and 20 hours of mathematics education. The two programs are decidedly different. As you have heard from the Budget Committee, the program is cost effective. Both the Budget Committee and the Academic Affairs Committee have stated that the programs do not duplicate each other. The Sequence in Mathematics Education would allow those students who wish to specialize in mathematics teaching in the elementary and junior high school levels to come and take the program of their choice, a program that they can have designated on their transcript, which will aid them in obtaining employment. It is a different program, a program that will enhance the graduates of Illinois State University.

Mr. Schmaltz recognized Dr. Dan Baxley, Chair of Curr. and Instruction, who said his department had tried to respond to the proposal. In the rationale for the proposal it stated: "the basic core of the Master's Degree program in Curriculum and Instruction no longer permits persons desiring certification as a mathematics teacher for grades 6-8 the 18 hours in mathematics and mathematics education needed to satisfy current state requirements." We contend that up to 24 hours of content specific (both content and pedagogy courses) are available through the Department of Curriculum & Instruction. We have provided student records that show this. We admit that there is some fuzzy wording in college catalogs, and have moved to ameliorate that situation. We feel that there is duplication. The issue of the transcript is not important. Under the new laws in the State of Illinois in that particular situation, the transcript wording is not a particular factor, because the certification office evaluates the transcript and decides through endorsement whether a student can teach more than 50% in a content area. Finally, the issue of sharing programs. He was concerned that the direction we are choosing here may send a signal to his department that we should be careful about sharing programs. The Math Department is excellent and has fine programs. We are now moving in a direction where programs may separate rather than work together. There is an implication from the public evaluating teacher education over the years that we need to move more toward sharing, with content area specialities. If a teacher education department moves to allow strong content area preparation at the undergraduate and graduate level, we may in fact establish a situation where the program later has to separate because the lion's share of the activity exists within a particular academic unit. He did not admit that the Math Department could not provide for those students under the umbrella of the C&I degree. His evidence showed that was possible. He encouraged cooperation between the departments.

XVIII-12 Mr. Shulman moved the previous question. (Second, Kirchner). Motion carried by a 2/3 vote.

XVIII-11 Vote on the approval of the Proposed Subdivision of a Degree Major: Master's of Mathematics; Sequence in Mathematics Education (9.11.86.6). Ms. Getsi requested a Roll Call Vote.
The motion carried: 38 yes; 6 no, with one abstention.

Committee Reports:

Academic Affairs Committee - no report.

Administrative Affairs Committee - no report.

Budget Committee - no report.

Faculty Affairs Committee - no report.

Rules Committee - no report. Ms. Roof called a brief meeting following Senate.

Student Affairs Committee - no report.

Communications:

Mr. Semlow announced that he would like to meet with the student senators who had not attended the student caucus.

Mr. Johnston had heard through the grapevine that some members of the Senate feel that students should not get involved here. He urged senators to talk to him if they had any problems.

XVIII-13 Mr. Thiel moved to adjourn (Second, Ramsey). Motion carried on a voice vote. The meeting of the Academic Senate adjourned at 9:05 p.m.

FOR THE ACADEMIC SENATE

DOUGLAS A. DELONG, SECRETARY

Date: 10/8/86 Volume No. XVIII No. 3

NAME	ATTEN-DANCE	VOTE MOTION # XVII-11	MOTION #	MOTION #	MOTION #	MOTION #	MOTION #	VOICE VOTE MOTION #	Y
BELKNAP	P	NO						XVIII-10	X
BLACKWELL	excused	--						XVIII-11	X
BORG	P	YES						XVIII-12	X
DELONG	P	YES						XVIII-13	X
EICHSTAEDT	P	YES							
FEASTER	P	NO							
GAMSKY	P	YES							
GETSI	P	YES							
HALL	P	YES							
HARDEN	P	YES							
HUBER	P	YES							
INSEL	P	YES							
JOHNSTON	P	NO							
KELLOGG	P	YES							
KIRCHNER	P	YES							
LAVIN	P	YES							
LESCH	P	YES							
LORBER	P	NO							
MC CLERNON	P	YES							
MC KINLEY	P	YES							
MILLS	P	YES							
MORREAU	P	NO							
MOTTRAM	excused	--							
NELSEN	excused	--							
NEWBY	P	YES							
NEWMAN	P	YES							
O'CONNER	P	YES							
O'ROURKE	P	YES							
OSUNA	P	YES							
PASULKA	P	YES							
PETROSSIAN	P	YES							
POOLE	P	YES							
RAMSEY	P	YES							
RITTER	P	YES							
ROBERTS	P	YES							
ROOF	P	YES							
SCHMALTZ	P	ABSTAIN							
SCHWEGEL	excused	---							
SEMLOW	P	YES							
SESSIONS	P	YES							
SHULMAN	P	YES							
SPENCE	P	YES							
STRAND, D.	P	YES							
STRAND, K.	P	NO							
THIEL	P	YES							
WATKINS	P	YES							
WHITCOMB	P	YES							
WOOD	P	YES							
WAGNER	P	YES							
	TOTAL	38 YES							
		6 NO							
		1 ABSTENTION							

SEP 11 1986

September 9, 1986

To: Members of the Academic Senate

From: Academic Affairs Committee

Re: Explanatory Note to Math Education Sequence Proposal

At our September 3rd meeting, the committee voted to recommend to the Senate for approval the proposal for the Mathematics Education sequence in the Masters of Mathematics degree. There was extensive debate during the meeting, however, about interpretation of course requirements in the C&I masters degree, and the potential impact of those requirements on a student's choice between the C&I program and the proposed Math Ed sequence. The committee voted to include this note of clarification as an addendum to the recommended proposal.

The proposal states that under the revised C&I masters program, a student choosing the Junior High/Middle School sequence may elect a maximum of 12-15 hours in mathematics and/or mathematics education. That statement reflects information provided by the C&I department to the mathematics department during preparation of the proposal, as well as information given by C&I representatives to the Academic Affairs Committee at a meeting last May.

During the meeting to consider the proposal, Dr. Baxley, the Chairperson of the C&I department, distributed a letter designed to clarify the confusion about the catalog description of the requirements for sequences of the C&I masters program. In his letter, Dr. Baxley noted that the department intended to revise the wording this semester. The summary comments stated that students in various sequences of the C&I Masters program "may take, with advisement, as many as 24 hours in a specific content area, not including the Culminating Field Experience which, itself, might focus on a special methods area." This option, however, is not identified in any of the written material that is available to prospective or current students, nor on the course planning sheet used by students. Consequently, the Academic Affairs committee felt that the statements included in the rationale for the Mathematics Education sequence reflected the C&I program options that are being offered to students.

9.11.86.6

SEP 11 1986

REQUEST FOR APPROVAL OF A SUBDIVISION OF A DEGREE MAJOR OR CHANGE OF NAME

1. **INSTITUTION** : Illinois State University

2. **RESPONSIBLE DEPARTMENT**: Mathematics Department

3. **PROPOSED SUBDIVISION TITLE**: Sequence in Mathematics Education

4. **PREVIOUS SUBDIVISION TITLE**: Not applicable

5. **CIPS CLASSIFICATION**: 13.1311

6. **DATE OF IMPLEMENTATION**: Fall, 1987

7. **DESCRIPTION OF CHANGE**: The Department of Mathematics currently offers a Master's Degree in Mathematics with concentrations in four areas. The proposed change is that one of these four areas of concentration be identified as a sequence.

MASTER'S DEGREE IN MATHEMATICS	Concentrations: statistics, applied mathematics, computational mathematics, mathematics education.

Figure 1: Current Master's Degree Program in Mathematics

Figure 1 shows the organization of the current Master's degree program in the Department of Mathematics. This program serves two types of students. First, the program serves persons who choose to concentrate in pure/applied mathematics. People with this emphasis usually obtain positions in industry (e.g., actuarial science) or continue their graduate education in a Ph.D. program at another institution. The second group served by this program is secondary mathematics education majors. These people are teachers of mathematics at the senior high school level. The current program requires students to complete coursework in algebra (MAT 317) and analysis (MAT 347). Also, students must take additional coursework in either algebra or analysis, must take a comprehensive examination in one of these two areas, or must give an oral presentation on some original work in an approved area of

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mathematics. In addition, students are encouraged to complete several courses in one of the concentration areas shown in Figure 1.

Figure 2 shows the organization of the proposed program.

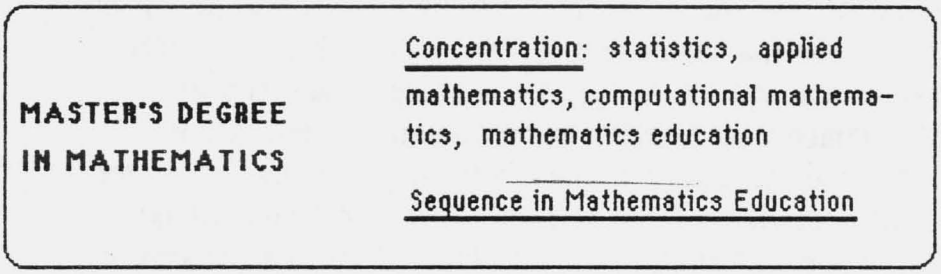

Figure 2: Proposed Master's Degree Program.

No new courses are needed to implement the proposed program, and no additional faculty, facilities, or equipment are needed for the proposed program. Everything needed to implement the proposed program is already in place; the proposed change involves only the formalization of a sequence in mathematics education.

The proposed program uses the notion of a core concept for the sequence. Sequences, by definition, are required to have a substantial core in common with the major, while at the same time being responsive to the needs of those for whom the sequence is designed. The proposed program will meet both of these objectives. The Department of Mathematics proposes that the core requirements be viewed as consisting of student knowledge of major fields of mathematics rather than as specific courses. In particular, the proposed core will maintain the same field requirements in mathematics (i.e., algebra and analysis) as does the M.S. in Mathematics, but will make adjustments in scope for the teaching level of the degree candidate. The addition of this sequence will permit persons interested in the teaching of mathematics at any level (not just senior high school as in the current program) to obtain a master's degree in the Department of Mathematics.

It is also important to note that the proposed sequence continues into the graduate program at the Master's level the clear distinctions between pure/applied mathematics and mathematics education already in the undergraduate mathematics program at ISU. The undergraduate program in mathematics education is strong and has shown substantial growth over the past few years. It is served by a faculty well-known throughout Illinois and the nation and its graduates are sought-after and well-received in schools throughout the state. The dichotomy between undergraduate mathematics and mathematics education majors delineates the speciality of the mathematics education major at that level. The present proposal requests the opportunity to extend this distinction of professional intent into the M.S. degree program in the Department of Mathematics.

8. **RATIONALE FOR THE PROPOSAL**: The Mathematics Department is proposing a sequence in mathematics education in order to meet the needs of teachers of mathematics in Illinois. In particular, there are two major reasons for the proposed change.

(a) Junior high/middle school teachers of mathematics are no longer adequately served by the master's degree program offered in the ISU Department of Curriculum and Instruction. Persons interested in teaching mathematics at the elementary and junior high school levels have, in the past, enrolled in the Master's Degree program in Elementary Education with a content focus in mathematics. This content focus allowed students to take as many as 24 semester hours (out of 32 or 39 hours) of coursework in mathematics and mathematics education. All of the courses for these 20-24 hours were taught by the mathematics education faculty in the Department of Mathematics in the College of Arts and Sciences.

The Master's Degree in Elementary Education is no longer offered by the College of Education. The program available now in the College of Education is a Master's Degree in Curriculum and Instruction. In this program, a student must select one of four sequences. The sequences are: (1) Early Childhood Education; (2) Elementary Education; (3) Junior High/Middle School Education; and (4) Secondary Education.

In this new program the number of hours of coursework in mathematics and mathematics education a student is allowed to take varies with the sequence selected (see Figure 3).

MASTER'S DEGREE IN CURRICULUM & INSTRUCTION

Early Childhood Sequence	Elementary Education Sequence
may elect 21-24 hours in mathematics and mathematics education	may elect 21-24 hours in mathematics and mathematics education
Junior High/Middle School Education Sequence	**Secondary Education Sequence**
may elect 12-15 hours in mathematics and mathematics education	may elect 15 hours in mathematics and mathematics education

Figure 3: The current Master's Degree Program in Curriculum and Instruction.

Most of the students who enrolled in the previous Master's Degree program in Elementary Education with a content focus in mathematics were teachers with an interest in mathematics at the junior high/middle school level. As a consequence of this program change in the Department of Curriculum and Instruction, persons with an interest in the teaching of mathematics who enroll in the junior high/middle school sequence can now take only 12-15 semester hours of coursework in mathematics and mathematics education. This restriction is less than was allowed in the previous program and, most important, is inconsistent with the recent calls for stronger content preparation for teachers at all levels, especially the elementary and junior high/middle school levels. (See, for example, *Tomorrow's Teachers: A Report of The Holmes Group* and The Conference Board of the Mathematical Sciences report entitled *The Mathematical Sciences*

Curriculum K-12: What is Still Fundamental and What is Not.) Also, this change means that the basic core of the Master's Degree program in Curriculum and Instruction no longer permits persons desiring certification as a mathematics teacher for grades 6-8 the 18 hours in mathematics and mathematics education needed to satisfy current state requirements. The proposed mathematics education sequence allows teachers interested in teaching mathematics at the junior high/middle school grades to obtain a Master's degree from ISU and pursue their area of teaching interest. As noted above, there are no additional courses needed to implement this sequence since all of the mathematics content and mathematics education courses that elementary and junior high school teachers have taken as part of their Master's Degree in Elementary Education are already taught in the Mathematics Department. The proposed sequence simply calls for a reconfiguration of these courses into a sequence in mathematics education.

Because the junior high/middle school sequence in the new Master's Degree in Curriculum and Instruction allows only a limited number of hours from mathematics and mathematics education to count toward the degree requirements, teachers interested in specializing in mathematics at this level are looking elsewhere for their graduate training. For example, during the summers of 1984 and 1985 (and again in 1986), the Department of Mathematics at ISU operated an Honors Teachers summer training program. This program is funded by The National Science Foundation and has served approximately 60 elementary and junior high school teachers who have an interest in specializing in mathematics. At least half of these teachers are interested in pursuing the Master's degree from ISU but will not now do so because of the course restrictions in the junior high/middle school sequence for the Master's Degree program in Curriculum and Instruction. These teachers have taken or will have taken about 24 hours of coursework in mathematics and mathematics education. Were they to enroll in the junior high/middle school sequence of the Master's Degree program in Curriculum and Instruction, many of those hours would not count toward the core requirements for this degree. For this reason, many of these potential candidates for a Master's degree from ISU have stopped taking classes from ISU, and some are looking elsewhere for a Master's degree. Also, the 60 teachers selected for the NSF program were selected from an applicant pool of over 200

teachers. Therefore there is reason to believe that there are many teachers at the elementary and junior high school levels interested in pursuing the proposed sequence in mathematics education.

It is also important to note that students who enroll in the Early Childhood or Elementary Education Sequences in the Master's Degree program in Curriculum and Instruction and take the maximum 24 hours of mathematics and mathematics education (in the College of Arts and Sciences) would have 24 out of the 39 hours (about 62%) of their coursework outside the college overseeing their degree program. Furthermore, the Master's Degree program in Curriculum and Instruction also offers a 32-hour option (Comprehensive Exam Option) and a 26-28-hour option (Thesis Option). Were one to select these options, more than 50% of the student's coursework would be in the Mathematics Department, not the department conferring the degree. When more than half of a student's coursework is in the mathematics department, it seems reasonable that the student's major advisor be in the mathematics department. This seems particularly important if a student elects to write a thesis related to mathematics education. The thesis director should be a professor in mathematics education, and professors of mathematics education are in the Mathematics Department at ISU.

(b) It is becoming increasingly important that people trained in the teaching of mathematics have this specialization noted on their official program transcripts. Persons who emphasize mathematics in the new Master's Degree program in Curriculum and Instruction do not receive any notation on their official transcript indicating that they have special training in the teaching and learning of mathematics. Instead their transcript states that they have completed a sequence such as elementary education or junior high/middle school education. Likewise persons enrolled in the current Master's Degree program in Mathematics who take a "concentration" in mathematics education do not have this emphasis noted on their records. (Areas of concentration do not appear on transcripts.) It seems reasonable that a student whose program emphasized courses in the teaching and learning of mathematics should have this appear in some offical way on the transcript. A sequence in mathematics education would appear on a student's transcript and would draw attention to this specialized

training. Indeed teachers currently taking master's degree courses in the mathematics department tell us that they would like some official notation for their work in mathematics education. They feel that such a reference will help them when they apply for jobs and may influence their salary at a future time. Having this sequence noted on transcripts will draw attention to the specialized training these teachers have received, thus strengthening their credentials.

It was noted above that the proposed sequence utilizes the notion of a core concept for the formal sequence. In doing so, the proposal maintains the present core requirements of algebra and analysis but does not identify specific algebra and analysis courses every student must take. This allows different algebra and analysis courses to be taken by elementary school teachers than are taken by secondary school teachers. The core areas for persons interested in elementary and junior high school mathematics would be satisfied by MAT 304 and MAT 305. The core areas for persons interested in secondary school mathematics would be satisfied by MAT 317 and MAT 347 (as in the current program). Everyone electing this sequence will be required to take MAT 401 and MAT 403. In addition, persons pursuing an emphasis in elementary or junior high school mathematics must complete MAT 304, 305, and 402. Persons pursuing an emphasis in secondary school mathematics must complete MAT 317, 347, either 316 or 407, and three mathematics courses numbered 407 or above. Additional course hours in mathematics, mathematics education, and electives outside the Mathematics Department will be selected in consultation with the student's graduate advisor and will be approved by the Mathematics Department Graduate Director. A summary of these courses is provided in Table 1.

The attached catalog copy provides the full details for the proposed program.

Table 1. Courses involved in the Sequence in Mathematics Education.

• Emphasis in Elementary/Junior High School Mathematics:

MAT 304 Advanced topics in algebra and geometry for elementary and junior high school teachers

MAT 305 Measurement topics for elementary and junior high school teachers

MAT 401 Current research in school mathematics

MAT 402 Instructional strategies in mathematics

MAT 403 Theories of mathematics learning

Additional electives selected from mathematics, mathematics education, and education (e.g., curriculum and instruction)

• Emphasis in Secondary School Mathematics:

MAT 316 or MAT 407 Abstract Algebra

MAT 317 Linear algebra

MAT 347 Introduction to real analysis I

MAT 401 Current research in school mathematics

MAT 403 Theories of mathematics learning

Additional electives selected from mathematics, mathematics education, and education (e.g., curriculum and instruction) with at least three mathematics courses numbered 407 or higher

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9. EXPECTED IMPACT OF THE PROPOSAL ON EXISTING CAMPUS PROGRAMS : The proposed sequence will have a positive impact on the Master's Degree program in the Department of Mathematics. As noted above, there already exist a significant number of teachers desiring this sequence in mathematics education. A large increase in the enrollment in the Master's degree in mathematics would be expected due to students entering the elementary/junior high school track in the proposed sequence. The proposed sequence should have minimal impact on existing M.S. programs other than the M.S. in Curriculum and Instruction. Its effect on the latter program is unclear. Some students who might currently opt for the M.S. in Curriculum and Instruction will undoubtedly view the sequence in mathematics education as more attractive and appropriate for their career goals. However, it is quite likely that the sequence in mathematics education will result in an increase in the number of students enrolling in certain

courses taught in the Department of Curriculum and Instruction. If the sequence in mathematics education attracts more graduate students to ISU, as we feel it will, many of these new students will enroll in courses in Curriculum and Instruction as part of their degree program in mathematics education.

Because the Departments of Mathematics and Curriculum and Instruction are currently offering distinct programs for persons interested in secondary education, there is no reason to suspect that separate programs for persons interested in elementary and junior high school education cannot coexist as viable programs. Indeed the existence of the proposed sequence in mathematics education will provide students a choice between a program that is heavily oriented toward mathematics and a program that permits some specialization in mathematics but is primarily directed toward more general pedagogical concerns.

10. EXPECTED CURRICULAR CHANGES INCLUDING NEW COURSES: All courses required in the proposed sequence are already in place as are all elective mathematics and mathematics education courses.

11. ANTICIPATED STAFFING ARRANGEMENTS: Staffing arrangements effective in 1985-86 are adequate to staff the proposed program. The Mathematics Department has 13 faculty with either the Ph.D. or Ed.D. in Mathematics Education. This is the largest collection of mathematics educators at any university in the United States.

12. ANTICIPATED FUNDING NEEDS AND SOURCES OF FUNDS: Current funds are adequate. The Department has been teaching the required and elective courses on a regular basis for several years.

Proposed 1987-88 Graduate Catalog copy pertaining to the proposed sequences in Mathematics and Mathematics Education

Programs Offered

The Department of Mathematics offers varied programs leading to the Master of Arts, Master of Science and Doctor of Arts degrees. At the master's level, a Sequence in Mathematics Education is available, along with concentrations in pure mathematics, statistics, computational mathematics, and applied mathematics. A doctoral program is offered to persons seeking advanced training for teaching in two-year and four-year colleges. Teaching assistantships and instructorships are available.

Master's Degree Programs

The student must meet the general university requirements listed elsewhere in this catalog for either the Master of Arts or Master of Science degree. In addition, the student must complete one of the two options in pure and applied mathematics or one of the two options in the Sequence in Mathematics Education. The Graduate Record Examination General (Aptitude) Test or the Advanced Test in Mathematics is required for admission.

Options in Pure and Applied Mathematics

Two options, requiring 39 and 32 hours, are available. Entering students must have completed an undergraduate mathematics major. Before completion of the master's degree, the student must complete MAT 317 and 347. A student must also select and complete either of the following two options:

Option I: At least 30 of the 39 hours required must be in mathematics. At least 18 of the 39 hours must be at the 400 level, with at least 12 of these in mathematics, including at least one course in algebra or analysis. Neither a thesis nor a comprehensive examination is required, but the student must maintain a 3.2 grade point average.

Option II: At least 24 of the 32 hours required must be in mathematics. At least 15 of the 32 hours must be at the 400 level, with at least 10 of these in mathematics. One of the following is required: a written examination over two areas, one of which must be algebra or analysis, or an oral presentation on a topic the student has investigated under the direction of a faculty member.

Areas of Concentration

There is considerable room for flexibility in selection of elective courses. The Graduate Advisor will assist students in selecting electives in the following areas of concentration.

Further graduate work in mathematics: 349, 407, 408, 447, 448, 449, 475, 476.
Statistics : 351, 356, 368, 450, 452, 453, 455, 456, 458.
Computational mathematics: 356, 360, 361, 363, 366, 368, 370.
Applied mathematics: 340, 341, 345, 349, 356, 360, 361, 362, 363, 366, 368, 370, 378.

Other courses not yet listed in this catalog are also available. Contact the Graduate Advisor.

Sequence in Mathematics Education

Individuals who are teaching or who plan to teach in public and private schools may wish to complete one of the two options in the Sequence in Mathematics Education. A program for each entering student will be designed in consultation with the graduate advisor to bring the student's credentials in content and methodology to a level appropriate for the needs of the student and the demands of the teaching profession. Each student electing this sequence must complete MAT 401 and 403. In addition, persons pursuing an emphasis in elementary or junior high school mathematics must complete MAT 304, 305, and 402. Persons pursuing an emphasis in secondary school mathematics must complete MAT 317, 347, either 316 or 407, and three mathematics courses numbered 407 or above. One of the following options must be selected and completed.

Option I: At least 30 of the 39 hours required must be in mathematics. In addition, at least 18 of the 39 hours must be taken at the 400 level, including at least 12 in mathematics. As a culminating experience, the student must conduct a research project and report the results in a colloquium. This project, which will be completed under the supervision of a graduate faculty member, must relate to the teaching of school mathematics and reflect the integration of mathematics teaching methods and mathematics content.

Option II: At least 24 of the 32 hours required must be in mathematics. In addition, at least 15 of the 32 hours must be taken at the 400 level, including at least 10 in mathematics. As a culminating experience, the student must complete either a written comprehensive examination or an approved thesis with no more than six hours of credit in Mathematics 499.

The Mathematics Department also cooperates with the Department of Curriculum and Instruction in the design of programs for elementary, junior high, and secondary teachers who elect the Master's Degree in Curriculum and Instruction.